The SIAM Assessment Support Toolkit

A Software System for the Support of Technology Impact Assessments

Application and Database Specification

Deliverable 11.2

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1. Introduction

The SIAM project has aimed to develop methodologies and guidelines for the assessment of security measures and technologies in the context of mass transportation facilities. Such assessments need to take into account many things, for instance that there are different actors or stakeholders involved; the nature of the travel- and security processes inherent to mass transportation facilities; and the range of legislative, cultural, economic, technical, ethical and societal impacts to consider.

The language used in the original DoW implies a database-focused description of such a support system. However, as a result of consultations and discussions within the consortium, it was realised that what WP11 actually envisaged was a software tool to support the assessment process being developed in WP12. Obviously, such a support tool requires the development of data structures. However, it was pointed out early on that software engineering practice demands the proper specification of requirements before related conceptual models and data structures can be sensibly developed. In other words, knowing the required functionality of the software application which needs to utilise or operate on any set of data presents a pre-requisite for performing any structural database design. As a result, comprehensive requirements- and knowledge engineering activities were carried out, and the emerging software prototype was tested, evaluated, and refined over various stages of its development, which included two user fora with external experts. Eventually, the software was completed to the specification achieved – offering an impressive range of functionality – and published for public use.

In the remaining sections of this introductory chapter, we will briefly describe the domain and general task for which the support system was built, and subsequently define the purpose and scope of this software.

Chapter 2 will provide a high-level overview of the system, and describe its architecture, users, main functional units, their different access levels and related user interfaces on a general level.

Chapter 3 will give insight into technical information about some of the developed conceptual mapping and related database models.

Chapter 4 will then go into the details of some major functional features, and illustrate the assessment support mechanics developed for the system.

The appendix of this document contains further documentation of the system, in particular the user manual for the administration level access, as well as instructions for installing and setting up the system.

1.1 Background

Originally based on the case studies which were carried out in WP2, the consortium devised an "idealised assessment process" which the SIAM AST should support. The background of SIAM is that such an assessment is made in the context of evaluating technology options for solving new or existing security problems. Figure 1 shows the basic activities underlying this process.

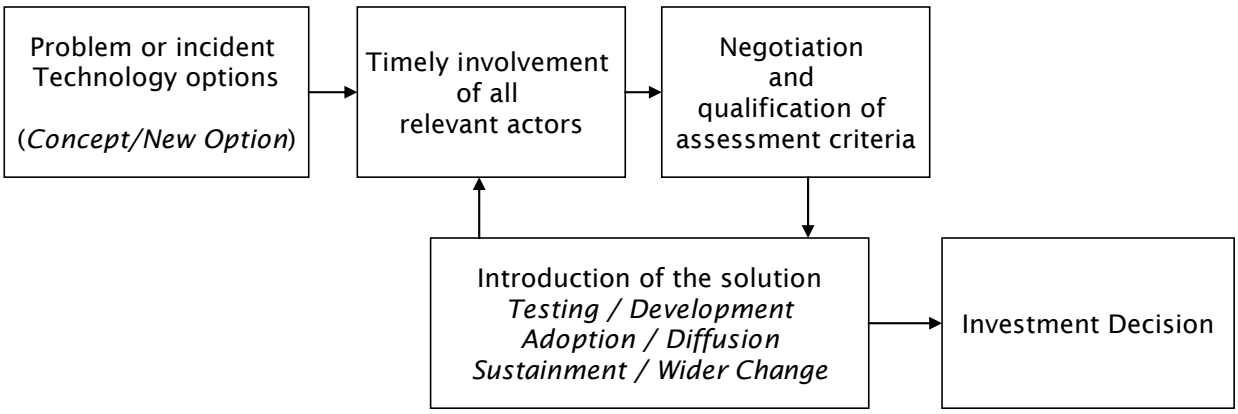

Figure 1: General Steps of the Idealised SIAM SMT Assessment Process

At the beginning of this process stands a scenario configuration phase in which the problem situation is described, and a technological solution suggested for resolving the problem at hand. This situation constitutes the beginning of the "Concept / New Option" phase of the technology acquisition process defined in [1] which is to be supported[1]. Different actors get involved in a subsequent evaluation process, and these actors may have different roles depending on the stakeholders they represent, and associated interests, motivations, and responsibilities. The actors engage in the definition, negotiation, and redefinition of the assessment criteria that are important to consider before a decision is made about whether an investment into some technology option should go forward. The intrinsic interests and responsibilities associated with each role will determine which assessment criteria will be deemed important by each particular actor. A challenge at this point is to make explicit those assessment criteria as quantitative or qualitative measures which allow a decision to be made whether a certain criterion has been fulfilled. After the first introductory phase, part of the process is repeated to address further phases of the technology acquisition process, which may involve other actors and related assessment

[1] see also Section 2.3 for more details

criteria. This idealised process assumes that after the technological solution has been further assessed in the context of development, implementation, testing, diffusion, sustainment, and wider change, a well-informed decision can be made.

1.2 Goals and Definitions

The main goal of the SIAM AST was identified in the collection and structured provision of information associated with various stakeholder perspectives that are applied in security technology assessment. The functionality provided by the SIAM database has the overall goal of increasing the reflexivity of information that is deemed relevant for a balanced technology evaluation amongst the stakeholders who are involved in the assessment process, considering their mutual responsibilities and interests. In terms of scope, the computational system will support the assessment process which was outlined in Section 1.1 by allowing users to specify particular problem scenarios, systematically collecting and storing information related to the above perspectives from the users and stakeholders, and making accessible this information in an assessment report that aids them in their effort to resolve open issues and evaluate the suggested technological solution at hand.

The range of assessment perspectives to include have been initially summarised by the partners in the so-called STEP typology (Security, Trust, Efficiency, Privacy), which was later changed to STEFi (Security, Trust, Efficiency, Freedom Infringement). This typology presents a loosely structured conceptualisation of the orthogonal interests and responsibilities that stakeholders might consider when they participate in a security technology assessment process. In their definition, the perspectives were described as follows:

> ***Security***
>
> *Security describes the technology's functionality in countering threats and reducing risks. It covers the questions whether the technology fulfills the promises and expectations regarding its performance. Assessment criteria are among others the detection rare, the false alarm rate as well as the impact of intended interference or environmental interference.*
>
> ***Trust***
>
> *Trust encompasses the experience of the technology provider as well as of the technology scrutinized in using the technology. Beside the experience, the subjective perception defines in which way a technology achieves an appropriate acceptance level. Assessment criteria for trust include for example the degree of discrimination regarding the use of technology as*

well as the potential physiological and psychological invasiveness of the technology (such as body scanner and claustrophobia).

Efficiency

Efficiency implies the economical dimension of the technology. Assessment criteria for this perspective are the product life cycle costs, such as the purchasing costs, the implementation costs, the operating costs and dismissal costs. But it also contains derivative criteria like opportunity costs and the impact on business processes, such as the through put or false positive alarm rates.

Privacy

The privacy dimension of technology assessment depicts the impact of a technology on the freedoms and rights of persons. Essentially data gathering and processing are major aspects of privacy assessment. But also rights like intimacy and self determination are part of the privacy dimension and must be taken into account for an assessment.

Source: [3]

In terms of the system's internal mechanics, these *perspectives* are used as semantic tags for assessment questions. They were later extended with another such tag, called *tasks*. The range of SIAM tasks has been defined by the partners as follows:

Assess organisational issues

Here all questions must be assigned to, that deal with the integration of the SMT into the business processes. This entails questions about allocation of responsibilities, actors and location.

Assess economic issues

This describes all questions about economical consequences of the implementation of the SMT. For example requirements of space, personnel and investments.

Assess technological issues

The technological issues deal with all attributes related to the functionality of the SMT. For example through-put time, electric or IT requirements or dependencies on further technologies (Software...).

Assess legal issues

The legal issues shall entail all legal obligations or code of conducts that are connected to the SMT.

Assess security issues

The security issues deal with all questions that assess the reasons for implementing the SMT and all questions about effectiveness in addressing them.

Assess acceptance issues

This category deals with all questions that are assessing the level of acceptance by an individual. This entails all scrutinized persons such as personnel and passengers.

Assess social issues

The social issues differ from the acceptance issues in that matter, that it deals with the meta-level of acceptance or the consequences of the SMT implementation on the society as a whole. This can be aspects such as a change in behaviour, because of the knowledge that the area is under surveillance.

Source: [4]

In terms of data modelling, the tasks are considered a much more differentiated categorisation of assessment dimensions. Technically speaking, both perspectives and tasks are used as independent semantic attributes of questions in the system, even though the definitions agreed by the partners show a clear conceptual overlap between both. Generally, such semantic tags are useful for analysing information gathering results according to the criteria embodied by them.

1.3 Basic Use Case

The development of a software system usually involves the design of one or more use cases that reflect the problem which is to be solved and map the real-world process to software processes and user interactions.

At its core, the acquisition of information has been realised through a mechanism of first defining an assessment case with all relevant information about a scenario and a suggested technological solution, and then posing questions to the AST users about the particular problem scenario which is to be assessed (Figure 2). The questions are aimed towards acquiring information from each perspective, targeted at particular actors and relevant for specific SMT classes, in order to qualify related assessment criteria though answers given

by the participants. The answers are stored in the actual SIAM database and associated with the specific assessment case at hand.

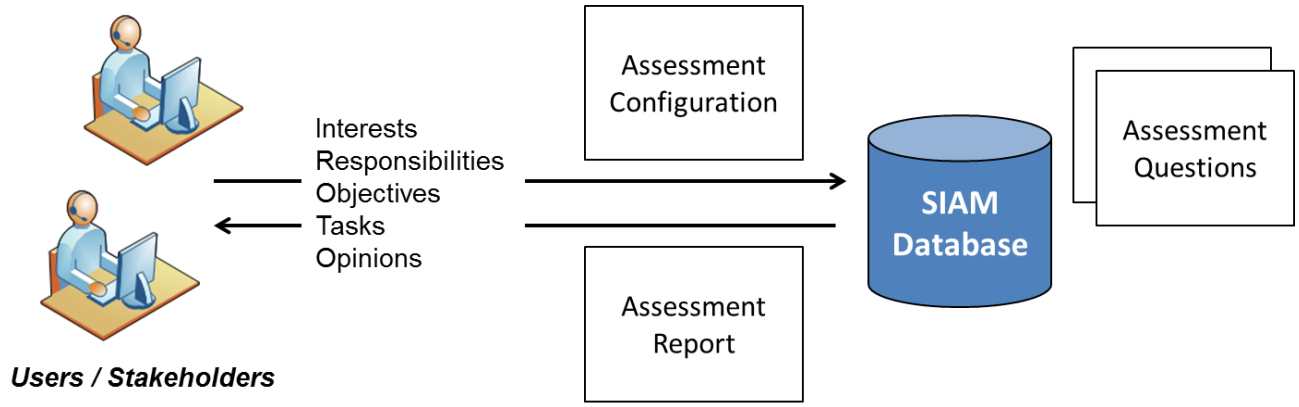

Figure 2: Elements of the Assessment Process

Eventually, users are enabled to generate reports or work sheets from the information collected that give an overview and further guidelines on the different issues addressed during assessment and also those which are yet to be considered. Any configurations made in the early stage of the assessment process (such as the actors invited, and technology options selected) impact on the kinds and number of particular questions asked. To target questions more effectively and rule out those which are not applicable, sophisticated control structures have been introduced into the question authoring process that allow strict sequences of questions to be defined, and conditions placed onto questions which are based on the answers given to specific previous questions.

In addition to a specification of roles for the participants in an assessment case[2], it was also recognised that the users of the system must perform different tasks, or functions, which are more closely related to what they do with the mapped features in the computational system rather than just based on their professional roles. Consequently, user functions were introduced as a means for distributing different organisational and contributory tasks in the assessment process (Assessment Leader, Assessment Participant, Information Provider, Observer/Auditor). These functions go along with certain permission and access rights to features of the toolkit that are relevant for each user to fulfil their particular set of tasks.

[2] See section 2.1 for details on the roles.

2. System Overview

This section provides an overview on the roles and functions of users who will be interacting with the system, the envisioned future architecture of the SIAM AST, its underlying infrastructure, and the purpose and scope of our prototype. Last but not least, the structure and range of core application units which have been created for the system are detailed.

2.1 SIAM AST Users – Roles and Functions

For the design of the AST, it has been important to determine the kinds of users which will interact with the system. The position put forward by the consortium partners was that basically, anyone who might be an actor or stakeholder in a technology acquisition process could be considered a user. Initially, two distinct groups of stakeholders were identified, and the relevant roles, responsibilities and interests elicited [6]. The results of these activities have been detailed in [5].

Ultimately, the consortium decided to employ a simpler list of role descriptions, based on the results of [9], and not to consider the previously developed *Areas of Interest and Responsibility (AIR)* [8] as a further qualification of those roles.

The following roles were specified:

- SMT Investor
- SMT Operator
- NGO
- SMT User Organisation
- Data Protection Authority
- Regulator / Politician
- Law Enforcement
- Technology Developer

In addition, user functions and related permissions which apply to tasks in particular assessment cases were defined:

Function	Permissions
Assessment Leader (Coordinator)	• Can set up new assessment cases • Can specify and invite other actors • Can answer assessment questions • Can edit and generate the overall assessment report
Assessment Participant	• Can access assessment cases (once invited) • Can answer assessment questions according to their specified role • Can create custom questions to be considered by other actors • Can generate a summary report of their personal contributions
Information Provider	• Can access specific assessment cases (once invited) • Can answer only those assessment questions which have been delegated by other actors
Observer	• Can access specific existing assessment cases • Cannot answer any questions • Can inspect the assessment report

Table 1: User Functions in the SIAM AST

2.2 System Architecture and General Description

The SIAM approach recognises that in the assessment of security technologies, the societal, technical, and economic impacts of the decision to invest in a particular solution have to be considered and made conscious to the different stakeholders participating in this process. Depending on the interests and responsibilities of the stakeholders, assessment aspects may be related to issues such as ensuring legal compliance, establishing and maintaining security, operating under financial obligations and restrictions, protecting civil liberties, or advancing innovation, for example. Consequently, there is a need to adhere to established standards and utilise up-to-date information that can be retrieved in the public domain or by government authorities (e.g., legal documentation, open standards, technical reports about newly developed technology, crime statistics, national and international threat assessments, research papers, etc). On the other side, there is also a desire to keep certain information within the facility or institution where an assessment is made, such as the physical layout of security sensitive areas, the functionality of existing installations, or location-specific threat scenarios.

Based on these considerations, we envision the future SIAM AST to work in the manner of a system that uses distributed data, with some information retrieved from the public domain or from NGOs or government authorities, and further, privately held information about

facility-specific models of threats, processes and technologies. This is not to say that local information cannot be shared: We can imagine, for example, that an exchange of relevant standards, best practices, assessment criteria or -scenarios between organisations can bring positive synergy effects and improve the speed and quality of technology acquisition processes across mass transportation facilities. However, a separation of the data will leave the assessing facility or institution in control of what private data to share and with whom.

At the heart of the computational implementation is a browser-based application that supports the SIAM security technology assessment process.[3] This can be hosted locally on a web server, such as an Apache or Internet Information Server, and hence installed at different local sites. Private data would be stored on a local SQL database, and public assessment information retrieved over the Internet from other databases which could be provided and maintained by public institutions or government authorities.

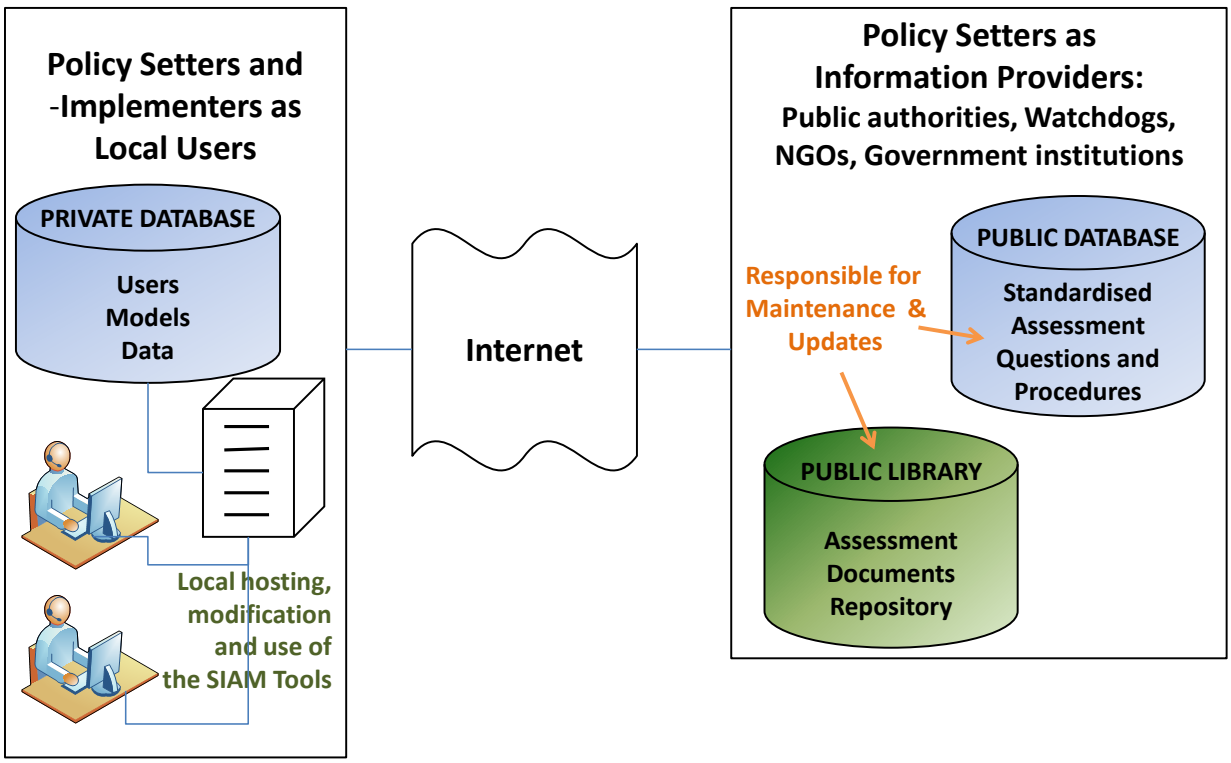

Figure 3: Envisioned SIAM AST Architecture

Figure 3 shows how this architecture could look like should the system be chosen to be adopted and deployed at a comprehensive, national or trans-national scale. Within the SI-

[3] A graphical overview of the initial outline of the process that is to be supported can be seen in Appendix 1.

AM project, our aim is to create a prototype of such a system which illustrates the capabilities of the assessment support application. As the partnerships with policy setter organisations which are required for implementing the above approach have not been established yet, we will realise the solution using local demo databases. The prototype functionality comprises a modular software platform which has a technology assessment support application as its core unit, which in turn connects to the SIAM database. This database will store various kinds of assessment information, such as that about the actors involved in the technology acquisition process, their particular roles, the assessment criteria related to these roles, and the questions that need to be asked to qualify these criteria for decision-making. Within the assessment support application, these questions are then posed to users of the system in some structured fashion, information collected from the users, and reports generated based on the questions asked and the answers received. On an administrative level, there will be facilities for creating and editing data that are necessary to run the application, manage users, and advanced options for modifying the system core.

A modular approach has been favoured such that additional functionality can be added after the project ends, in order to progress from a prototype to a production system that can be employed in real use contexts. For example, based on the methodology developed for WP6, an additional module could be created which feeds the results of threat assessments carried out locally into the technology assessment support application. Future developments may also involve additions or refinements of the prototype functionality, such as replacing or extending the generation of assessment reports with a ticketing system in order to actively distribute information gathering or assessment tasks across different people and organisations. Naturally, developing such additional functionality would require the deployment of the system within a larger network of actors first, such that organisational structures can be modelled and made available for these additional modules.

2.3 General Application Structure

Based on the different nature of the tasks that users of the SIAM AST can perform, the software platform has been structured into a user- and an administration level. While the user level is intended to host the functionality directly related to assessment support, the administration level provides tools for creating and editing the support data needed to run the system, such as database connections, users, or data profiles that are used by the assessment support application or any future modules added to the platform.

2.3.1 User Level

SMT Assessment Support Module

The assessment support module is the central functionality to be implemented in the prototype. Essentially, this part of the software is a front-end to the SIAM database with which users engage in assessment activities. This part of the software will be realised with the provision of different screens that provide active guidance to the user, i.e. a Wizard-like interface that ensures all necessary inputs are made and in the right order for the next activity to proceed. An overview of the first design of an operationalised assessment support process can be seen in the Appendix of this document.

This main module of the SIAM has been further structured into three units. The information specified and collected within each unit will contribute towards the final assessment report that is being generated as an output of the whole module.

I) The **ASSESSMENT CONFIGURATION** unit provides wizard-style input masks to facilitate the

1) Specification of the problem context for which technology options need to be assessed.

   Several screens are used to collect all the information that comprise the scenario context for the assessment such as details about the facility for which an assessment is made, the threat to address, the technology options considered, and the corresponding stage in the technology acquisition process (Figure 4).

2) The selection of actors that are to be involved in the assessment process, the roles these actors will take in this process, as well as their assessment functions.

   In this second step, the user will first provide information about themselves as assessment leaders, and then specify the actors which will be involved in the assessment process. Further, the user is supposed to specify which role and function each actor will take in the process.

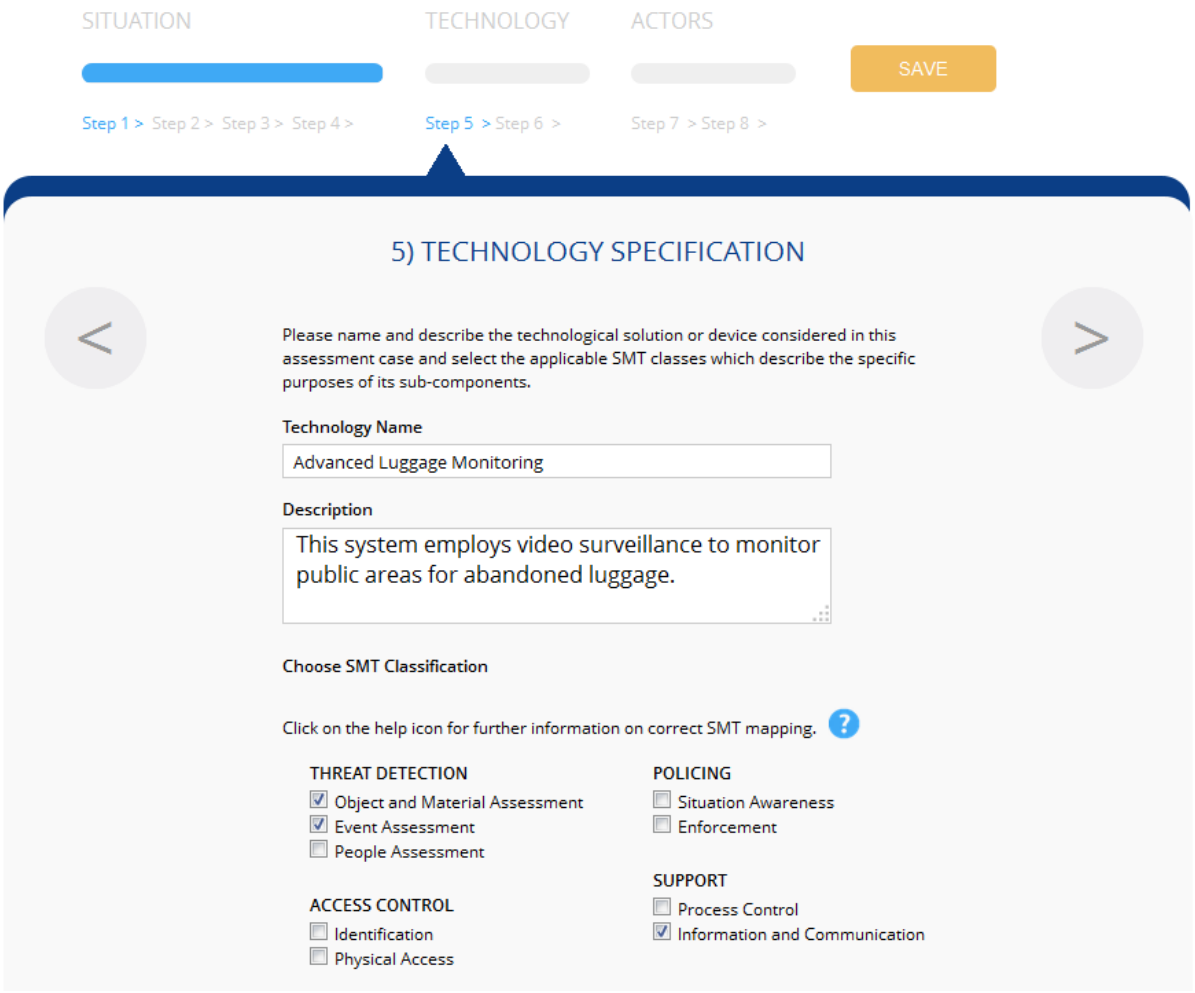
SITUATION
TECHNOLOGY
ACTORS
SAVE
Step 1 > Step 2 > Step 3 > Step 4 >
Step 5 > Step 6 >
Step 7 > Step 8 >
5) TECHNOLOGY SPECIFICATION
Please name and describe the technological solution or device considered in this assessment case and select the applicable SMT classes which describe the specific purposes of its sub-components.
Technology Name
Advanced Luggage Monitoring
Description
This system employs video surveillance to monitor public areas for abandoned luggage.
Choose SMT Classification
Click on the help icon for further information on correct SMT mapping.
THREAT DETECTION
Object and Material Assessment
Event Assessment
People Assessment
ACCESS CONTROL
Identification
Physical Access
POLICING
Situation Awareness
Enforcement
SUPPORT
Process Control
Information and Communication

Figure 4: SIAM AST – Example Screenshot of the Configuration Wizard

II) The **INFORMATION GATHERING** unit uses the configuration information of an assessment case to gather answers to pre-defined assessment questions from the actors.

The display of these questions is controlled by certain relevance criteria, such as the technology considered in a case, or the types of actors at which certain questions are targeted.

In addition to categorising questions according to assessment perspectives, the database should ideally support different sets of questions corresponding to the phases of the technology acquisition process, as defined in the innovation journey report:

Concept/ New Option

Based on assessments, the concept/new option phase starts either with the identification of a new technological option or with the need or pressure for a new technol-

ogy to meet a certain problem. During that phase technologies only exist as an idea combined with high expectations about the performance qualities and their efficiency in countering threats and reducing risks. Different actors are interested in influencing the technology development. For this purpose they are mobilizing resources, articulating demands and building networks in order to adapt the technology. Concerning the analysis of the security technology assessment process it is important to answer the question why a certain technology is selected by whom for further developments.

Testing/ Development

During the testing/development phase different assessment criteria are used to evaluate the technology performance. Pilot tests in the existing infrastructure are conducted and give some insights about the compatibility and performance of the technology. At this stage various problems occur, which leads to a sobering phase after the big promises in the concept phase. Furthermore, learning processes under time pressure occur. The central question here is how the technology is assessed by the decision makers and which criteria have been used for the testing and development.

Adoption/ Diffusion

After a phase of testing and problem solving, the technology is introduced to the infrastructure. The adoption of a new technology contains a connection to the existing technology: as a replacement, an addition or an integration in existing processes. At this time, the technology has to demonstrate its reliability and system compatibility. The relevant questions are "who is deciding at which time the technology is adapted" and "what assessment criteria are relevant for the decision".

Sustainment/ Wider Change

In the sustainment/wider change phase the new technology becomes an existing standard without any open questions while economies of scale and scope of the new technology are explored and actors are engaged in promoting the technology. Furthermore, possibilities for expandability are identified and tried to be realized. The questions here are "who is defining new possible expendabilities" and "which assessment criteria are used".

Source: [1]

It was decided that the prototype will only support the first phase since the partners were only able to provide assessment questions for this phase.

III) The **ASSESSMENT REPORTING** unit will create documentation useful for further evaluation and management activities in the overall assessment process.

The assessment leader can generate a report which details the problem context, indicates the overall level of progression in the assessment process (depending on the amount of information still outstanding), and summarises all information collected, grouped by the different tasks and perspectives involved. Further, some assessment scores are provided for the guidance of assessment activities.

Whenever further assessment progress has been made, the assessment report can be re-created at any time.

Optional Modules

The following modules were envisioned as useful future extensions of the system. Their requirements have been considered as far as possible in the structural design of the core application to ensure they can be added later without causing major problems, yet they present optional functionality beyond that what has been specified in the DoW. In the prototype, we have illustrated in part how the interconnection with such modules could look like.

Threat Assessment

A tool for planning threat assessment sessions, and recording the results according to the methodology developed in WP6. These could then form a partial input for the technology assessment support system. The assessment case configuration wizard in the prototype does provide input elements that correspond with the methodology in SIAM's WP6 [2].

Library

Navigation and database slots for library search. Whenever a user encounters a question that he or she cannot answer, this optional tool could allow them to search a repository of suitable documents for further information. The prototype features supplementary resources that are directly associated to questions and which users can consult. In addition, a simple library tool which automatically collects and lists any resources provided by question authors has been provided.

Ticketing

Once practicable models of actors, stakeholders, and related organisations have been created, we imagine that a ticketing system could be developed for distributing requests for information or specific assessment tasks to the users responsible within the facility or within other organisations. Partial elements for such functionality have been implemented

in the form delegation and communication features, which allow the auditable transfer of assessment questions between actors, as well as a comprehensive messaging system that coordinates those actions.

2.3.2 Administration Level

User Administration

This part of the tool provides facilities for system administrators to create and manage user accounts, and set specific options for each user. For the prototype, a comprehensive system of user permissions will not be required. Here, having individual user accounts serves the primary purpose of being able to create actor-role configurations that can be associated with the user accounts. In practice, this means that different actors and/or stakeholders could be enabled to log on to the system, participate in the assessment process, or address tasks that have been assigned to them by other users. The prototype does, however, distinguish between different user types, where “Contributors” represent normal SIAM AST users, whereas “Administrators” and “Delevopers” can also access the SIAM AST Administration Console (which normal users should not).

Question Pool Administration

This part provides a comprehensive authoring toolkit for creating and editing screens and screen groups associated to the assessment questions in the system, and setting relevance criteria and conditions.

Advanced Database Options

There are a number of advanced database operations available in the Administration Console that allow modifying and adapting the system’s core data in order to allow installers to exploit its basic mechanisms in different contexts. These options are primarily intended for maintenance purposes, and to facilitate the continued use of the toolkit as a commercial or research tool after the SIAM project.

3. Database Model

The database model defines the entities and relations which will be used to structure information in the database. It describes the main conceptual entities used in mapping the assessment process, as well as the physical data structures necessary to facilitate the software's assessment support functionality. Most conceptual underpinnings have already been discussed in the initial database specification [5] and subsequent reports [11–19], and summarised in chapter 2 of this document. In this chapter 3, we will briefly reiterate the ideas underpinning some of the main concepts developed, and then focus on presenting the physical database model in terms of entity-relationship diagrams, as well as a detailed description of the data structures developed. Further in-depth specifics on the conceptual structure of the assessment support elements, in particular the definition of the question pool and information gathering mechanics, can be found in the SIAM AST Administrative manual, which is attached to this document as Appendix A.

3.1 Main Concepts

3.1.1 Assessment Case

The concept of an assessment case has been devised as a container for the description of a particular assessment problem. It comprises a narrative of the initial situation, detailing the location, the threat, a technology specification in terms of related SMT types, and the acquisition stage for which an assessment is to be made. Further, the assessment case also contains information about the different actors who are involved, their professional roles, and assessment functions in the case.

3.1.2 Actors

Actors are the individuals who are involved in an assessment process. Actors usually represent different institutions or groups of stakeholders, and take part in the negotiation of assessment criteria that will be applied for evaluating technology options.

3.1.3 Roles

Actors represent different roles in an assessment process which correspond to particular interests and responsibilities of their institution or stakeholder group.

3.1.4 Topics and Aspects

The ideas previously associated with assessment criteria and KPIs [5] have been concretised in the form of a two-tier hierarchy of *topics* and dependent *aspects*, which are used to give a basic structure to assessment questions. Both are embedded in further conceptual elements belonging to the overall information gathering system, in particular *screens* and *screen groups,* as well as their related sub-concepts. Detailed information about how these concepts are defined and interrelated can be found in Appendix A.

3.1.5 Assessment Questions

Like topics and aspects, the assessment questions are also deeply intertwined with the information gathering system employed by the toolkit. In this course, the conceptual structure of assessment questions has been substantially extended to incorporate additional semantic tags (perspectives, tasks), supplementary resources, meta information, relevance information (technologies, actors), the grouping and sequencing of questions (within screen groups), the specification of conditionality, and many more.[4]

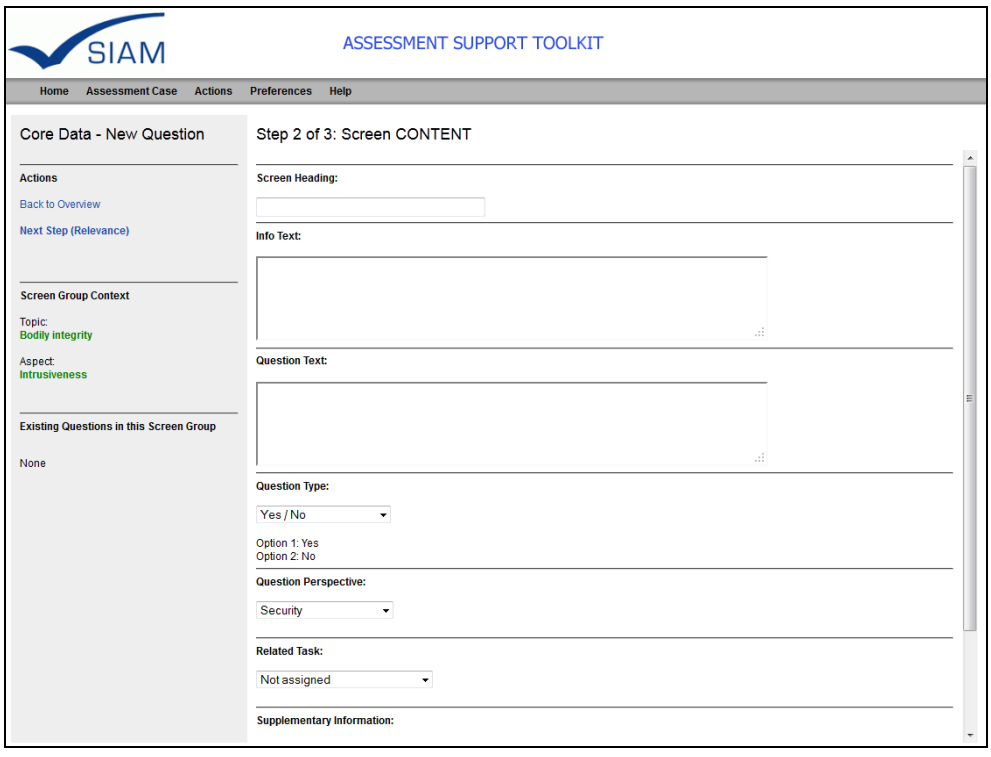

Figure 5: Example Screenshot of the Actual Database Tool for Authoring Assessment Questions

[4] See Appendix A for detailed information.

We have developed a comprehensive set of authoring features which the SIAM partners initially used to specify their particular assessment questions (See an example screenshot of the authoring tool provided to the partners in Figure 5). This tool was then subsequently further developed and integrated into the SIAM AST Administration Console.

3.1.6 Security Measures and Technologies (SMTs)

One of the most important concepts at the core of the system relates to the "security measure technologies" (SMT) which are being assessed. The consortium realised early on that the initial conceptualisation in the DoW was not suitable to frame the related issues appropriately. Our revised conceptualisation of SMT has been based on a process-based model of the security domain which identifies the nature of security policies as the defining element for security measures, which are purposeful activities, in the first place. Our model then differentiates the *actions* for achieving the purpose of a policy from their implementation aspects, i.e. the *actors* and/or *technology* involved in executing the actions. Our approach recognises that *technology* as a concept comprises more than just a naïve perception of "technical devices" (e.g. procedures can be considered technology, too). More importantly, the approach allows pinpointing more precisely the locus of those SMT elements that may impact on the broad range of assessment issues addressed by SIAM.

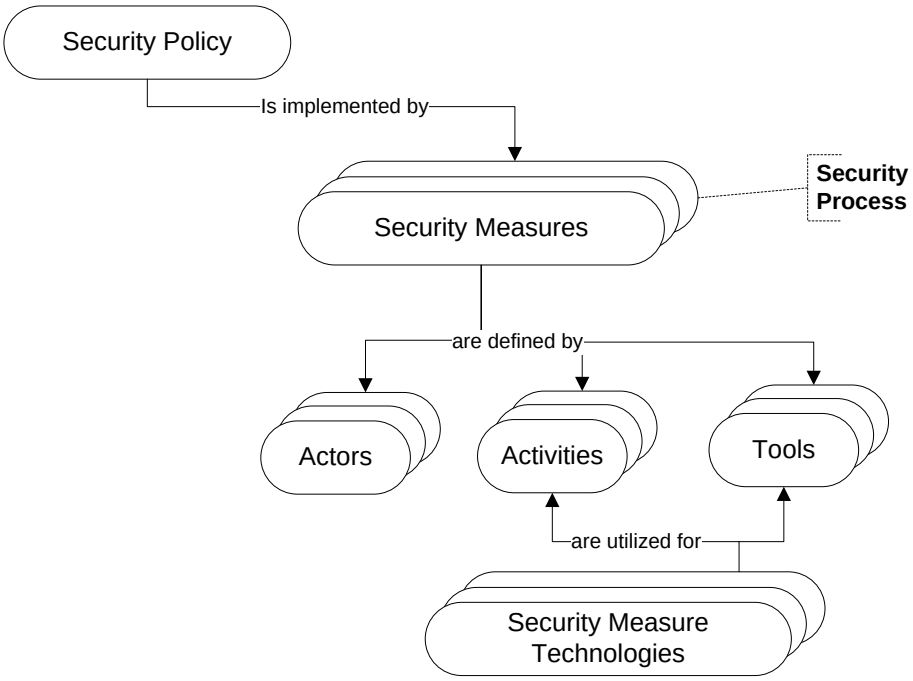

Figure 6: A Process-based Model of SMT

A typology was developed which uses *SMT groups* and *SMT types* that encode the intent of common security policies underpinning major security plans, and which integrates the related ideas such as the use of preventive and corrective measures, or the establishing and protecting of the integrity of security, for example. It also acknowledges that real-world impact assessments do not usually face single technologies rather than complex technology stacks embedded within solutions, where every individual technology part may have a distinct impact on various issues, depending on what it is used for. For example, a person or luggage scanner device actually combines a number of different scientific technologies for imaging, analysis, reporting, etc., in order to offer a technological solution to a problem, and in compliance to the policies outlined in a security plan. Moreover, a solution is actually part of a wider security process involving human operators and their specific activities, as well as architectural elements and economic constraints, for instance. In addition, this process then intersects with other processes, like travel. The particular nature and parameters associated with those processes need to be considered as well.

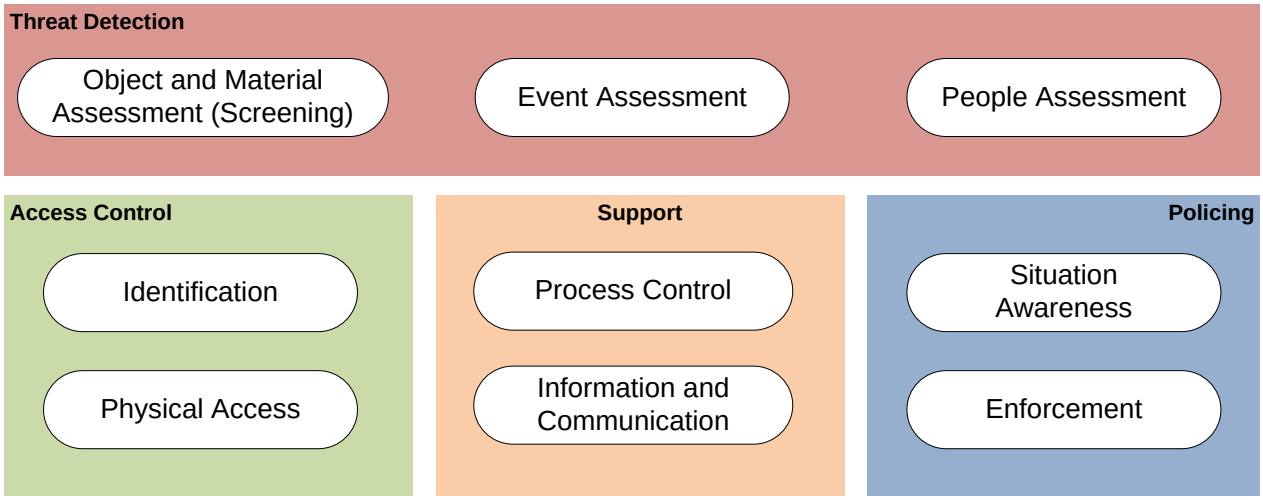

Figure 7: The SMT Typology

The main advantage of the SMT typology is that it adopts a purpose-oriented perspective in the definition of security technology, as well as a level of granularity that is

a) Much more explicit and focused than the original definition of the SMT concept, and

b) Sufficient to model and interrelate the various other assessment issues involved in SIAM (e.g. threat, crime, infringement, acceptance, effectiveness, etc.) on the basis of a common technology specification.

3.1.7 Assessment Scores

During reporting, the SIAM AST takes attributes of the *questions* asked (count, perspective, task), as well as the *answers* given (count, actor role) to calculate different scores, and include these in the assessment report. All scores come in three flavours:

1) Based on the entire question pool (Global score)
2) Differentiated by individual Assessment Perspectives
3) Differentiated by individual Assessment Tasks

Completion

This is a measure of how many of the different questions in an assessment case have been answered at all. The calculation is based on the non-conditional questions of the screen groups because are the ones guaranteed to be shown. If each of those questions has received at least one answer, the score will be 1 (100%.).

Calculation:

x: The count of answers given for any non-conditional questions of the case

divided by

y: The count of all non-conditional questions that would be posed in the case

Involvement of Actors

This score is based on the number of different actors which have been invited to a case vs those which should have been invited (target roles specified for the questions), weighted by the number of questions which these actors would see.

In addition to the score, a list of the actors who should be invited to the current is provided as well in the assessment report.

Calculation:

x: The count of distinct roles that have been invited * nr of unconditional questions they would see

divided by

y: The count of distinct roles that each unconditional question was targeted at * nr of those questions

Participation

This score is based on the number of different roles that have answered any questions vs all those which SHOULD have answered them (target roles specified for the questions).

The participation score is useful to identify assessment questions that have received an unbalanced set of answers, in terms of the different actor roles from which the answers come from. This score is therefore a further qualification of the completion and actor involvement scores.

Calculation:

> x: The count of distinct roles that have answered * nr of unconditional questions.
>
> divided by
>
> y: The count of distinct roles that have been invited * nr of unconditional questions the related users would see.

3.2 Physical Data Model

The physical data model codifies and structures the data and information required to facilitate the functionality of the assessment support software. Since the SIAM AST uses a relational database, data tables need to be specified that define the relevant concepts, and the specific attributes that characterise these concepts. The structural information in these tables then needs to be interrelated to form an effective data model (Figure 8), according to established design principles, so that the data model reflects abstract properties of the embedded concepts and their relations with each other (like cardinalities and constraints, for example).

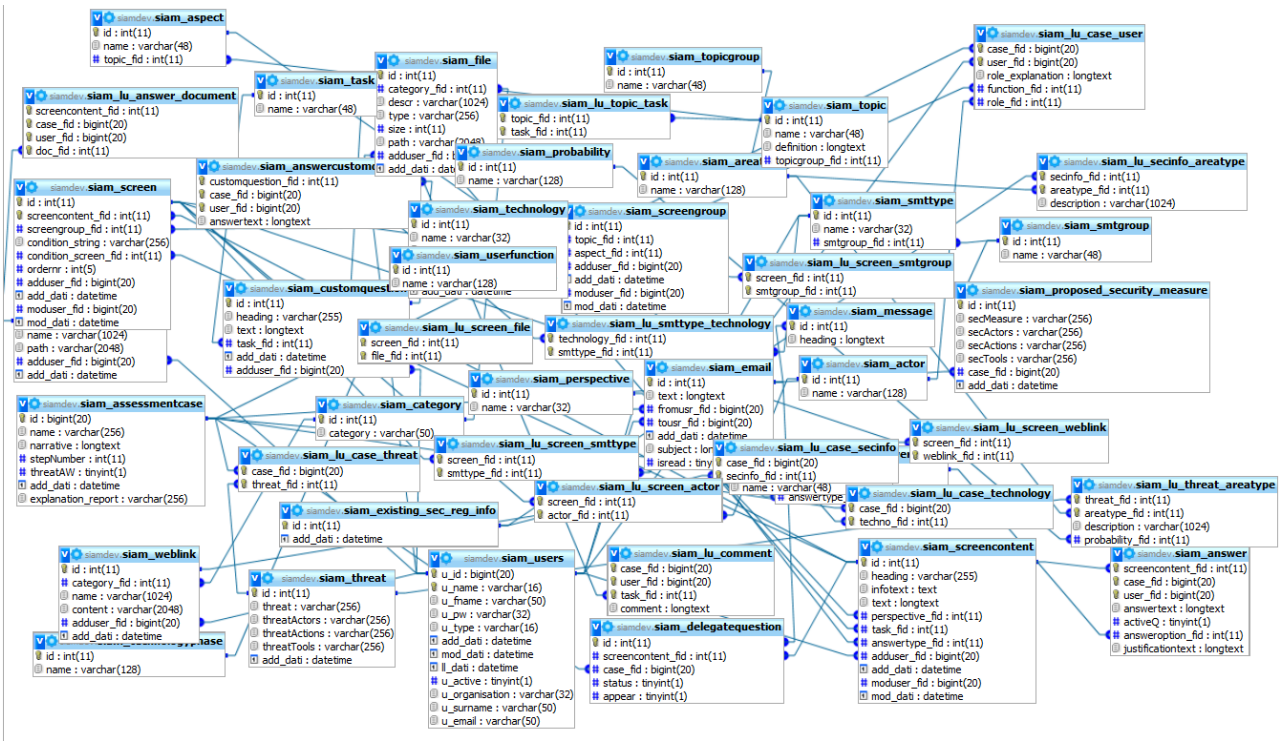

Figure 8: Detailed ER-Representation of the SIAM AST Data Model

3.2.1 Database Entities

In the following, we will present a comprehensive list of all the database tables developed for the SIAM AST and indicate briefly the purpose of each (Table 1).

SIAM AST Table Name	Purpose
siam_actor	This table contains the different types of actor roles supported by the system.
siam_answer	This table stores all the answers and justifications given to assessment questions, across all defined assessment cases.
siam_answercustomquestion	This table stores the answers given to any custom assessment questions posed by individual users.
siam_answeroption	This table contains additional information about the different answer types supported for assessment questions.
siam_answertype	This table contains the different answer types supported for assessment questions, e.g. single- or multiple-choice, Yes/No, free text, etc.
siam_areatype	This table contains threat assessment information of the assessment cases created with the system.
siam_aspect	This table contains the second-level element of the hierarchy that structures assessment criteria, for instance topic attributes or dimensions of normativity.
siam_assessmentcase	This table stores the names of the different assessment cases currently specified in the system.
siam_category	This table contains the available library categories.
siam_customquestion	This table stores the custom assessment questions which were defined by individual users.
siam_delegatequestion	This table stores information about all the questions that were delegated during assessment.
siam_document	This table stores information about the documents which users have attached to their answers.
siam_email	This table stores the contents, senders, recipients, and status information about internal messages which users can send to each other.
siam_existing_sec_reg_info	This table contains threat assessment information of the assessment cases created with the system.
siam_file	This table stores information about all supplementary files supplied with authored questions.
siam_lu_answer_document	This table links documents supplied with the users' answers to assessment questions.

siam_lu_case_secinfo	This table links configuration information from a scenario with the particular assessment case created for that scenario.
siam_lu_case_technology	This table links configuration information from a scenario with the particular assessment case created for that scenario.
siam_lu_case_threat	This table links configuration information from a scenario with the particular assessment case created for that scenario.
siam_lu_case_user	This table links configuration information from a scenario with the particular assessment case created for that scenario.
siam_lu_comment	This table stores the additional content created during the editing of an assessment report.
siam_lu_screen_actor	This table links actor role information with screens.
siam_lu_screen_file	This table links supplementary file information with screens.
siam_lu_screen_smtgroup	This table links SMT group information with screens.
siam_lu_screen_smttype	This table links SMT type information with screens.
siam_lu_screen_weblink	This table links supplementary web resource information with screens.
siam_lu_secinfo_areatype	This table links up certain threat assessment information from a scenario.
siam_lu_smttype_technology	This table links configuration information from a scenario with SMT types.
siam_lu_threat_areatype	This table links up certain threat assessment information from a scenario.
siam_lu_topic_task	This table links topics with topic groups.
siam_message	This table stores the subject headers of internal messages which users can send to each other.
siam_perspective	This table contains the perspective definitions which are used as semantic attributes of assessment questions.
siam_probability	This table contains threat assessment information of the assessment cases created with the system.
siam_proposed_security_measure	This table contains threat assessment information of the assessment cases created with the system.

siam_screen	This table links together all information that is necessary to present an assessment question to the users, including conditions, and the sequence number of a question within a screen group.
siam_screencontent	This table contains all data that is directly related to an assessment question such as heading, question text, perspective, task, answer type, etc.
siam_screengroup	This table contains information about screen groups, i.e. containers used to organise individual, related questions such that they can be presented to the user in a sequence, or with certain conditions in place. The screen group also links to the topic and aspect which those questions share.
siam_smtgroup	This table contains the groups defined in the SMT typology, e.g. Threat Detection, Access Control, etc.
siam_smttype	This table contains the different SMT types, e.g. Identification, Situation Awareness, Access Control, etc.
siam_task	This table contains the task definitions which are used as semantic attributes of assessment questions.
siam_technology	This table contains configuration information of the assessment cases created with the system.
siam_technologyphase	This table contains configuration information of the assessment cases created with the system.
siam_threat	This table contains threat assessment information of the assessment cases created with the system.
siam_topic	This table contains the top-elements of the hierarchy for structuring assessment criteria.
siam_topicgroup	This table contains groupings of topics to allow users to find particular assessment criteria faster when using the tool (optional).
siam_userfunction	This table stores the different functions which can be assigned to the actors that get invited to an assessment case.
siam_users	This table stores the information about SIAM AST user accounts.
siam_weblink	This table stores information about all supplementary web resources supplied with authored questions.

Table 2: SIAM AST Database Tables

3.2.2 Entities and Relations

Figure 9 shows the ER-Diagram of the SIAM database, at the level of database tables.

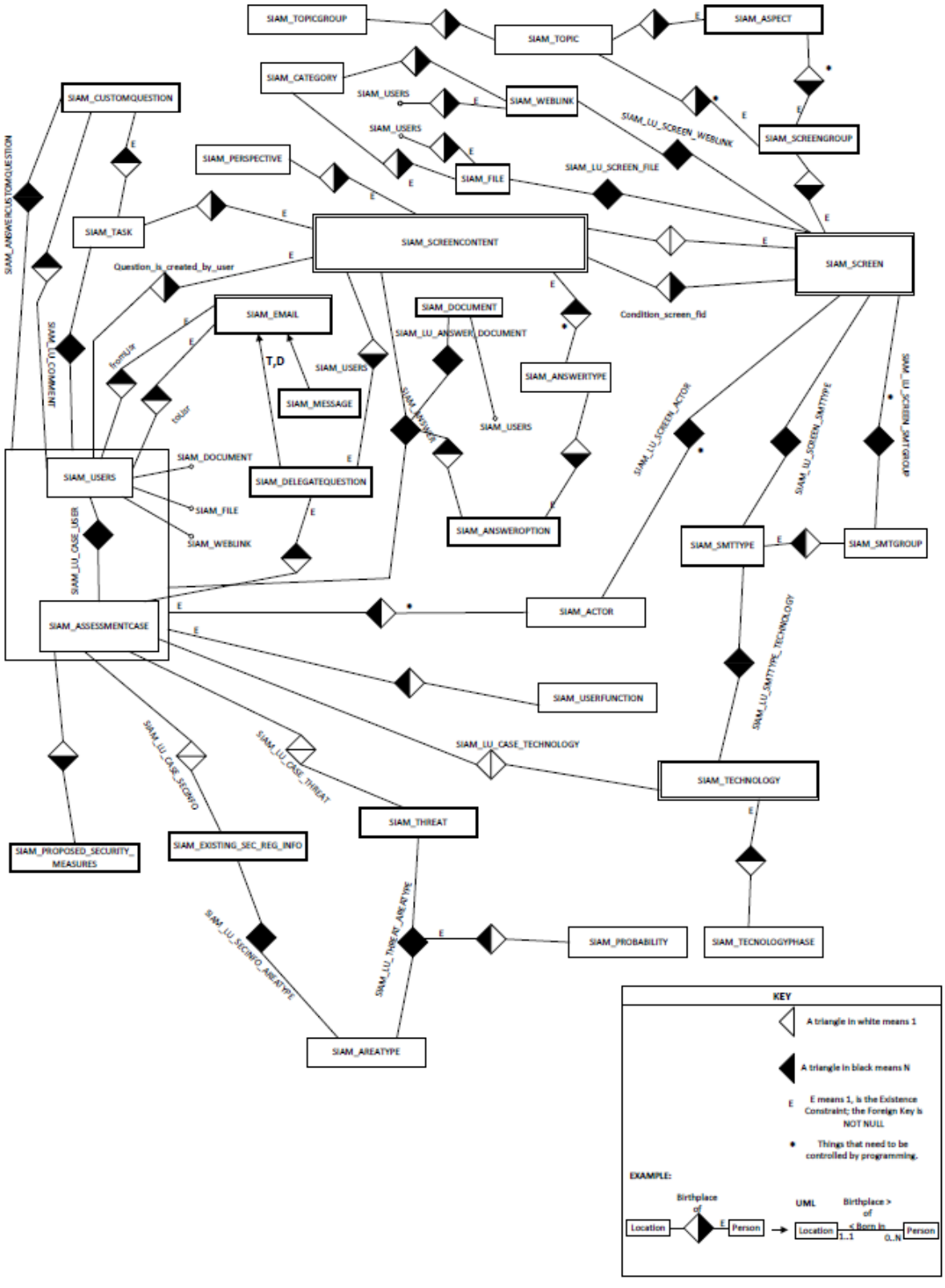

Figure 9: High-level ER Diagram of the SIAM AST Tables

4. Main Features

The sections below list the main features which have been implemented in the prototype, ordered by the application structure which was outlined in Section 2.3. For simplicity, information about the developed range of technical functionality that was required to facilitate these features, and any auxiliary features like help & support, have been omitted.

Detailed descriptions of the SIAM AST features, illustrated with screen shots, will be provided in the deliverables of WP12 (handbook, guidelines).

4.1 User Level

4.1.1 General Features

- SIAM AST Dashboard:

  Create new assessment cases; Display all existing assessment cases including options to configure, enter assessment, and reporting.

- Comprehensive Internal Messaging System:

  Create and reply to messages sent from other users; Receive invitations to assessment cases; Receive notifications for delegated questions including options to accept or reject such delegations.

- Library:

  Listing of all file-based and web-based resources supplied during the authoring of assessment questions, ordered by library categories.

- Profile Editor:

  Input forms for changing user account information: Name; Surname; Organisation; Email address; Option to change the current password.

- Help:

  Across the various functional parts of the system, help icons have been included that give additional assistance to users on how to use particular features.

4.1.2 Assessment Configuration Unit

- Dedicated wizard-style tool for setting up and editing assessment cases
    - Step 1 - General Information:

      Scenario Name; Scenario Narrative; Switch for enabling the threat assessment workshop results input screens (Steps 2 – 4), or skipping to Step 5 if no workshop has been conducted beforehand.

    - Step 2 - Threat Assessment Workshop Results:

      Threat description; Threat Actors; Threat Actions; Threat Tools; Affected Areas, Assets and Probabilities.

    - Step 3 - Existing Security Regime Information

      Description of existing security measures at the facility, categorised by area: Public areas, Terminal/Station, Ramp/Train/Tunnel, Baggage/Control Center, Other.

    - Step 4 - Proposed Security Measures

      Details about the proposed security measures that came as a result of the threat assessment workshop, differentiated by Security Actors, Security Actions, and Security Tools.

    - Step 5 - Technology Specification

      Technology Name; Technology description; SMT Classification.

    - Step 6 - Technology Acquisition Phase

      Selection of the phase (currently “Concept / New Option” only); Details.

    - Step 7 - Assessment Leader Information

      Display of data about the current user including: Full Name; Organisation; E-mail Address. Selection of the Professional Role for the current case; Explanation of the role; Assessment Function (automatically set to Assessment Leader).

    - Step 8 - Assessment Actors Information

      Tool for inviting actors to the assessment case; selection of the Professional Role for the each actor, as well as the Assessment Function of the actor; Management of all assigned users (change role, unassign).

4.1.3 Information Gathering Unit

- High-level Topic selector tool, visualising the structure of available assessment questions and personal completion progress for each user:

  Panels for each task; Sub-panels for each topic; Sub-panels for aspects; Overall completion progress bar; progress indicator for all related questions displayed on the panels, as well as for custom questions available, and the related progress made with those; Population of the filters with the information selected in this tool to allow seamless interoperability.

- Comprehensive Assessment Interface for information gathering:

  - Assessment Case Information Panel

    An expandable/Collapsible panel containing assessment case configuration details for reference (Situation, Technology, Invited Actors and their roles and functions); Quick links to Configuration, Topic Selector, and Reporting (Availability according to the defined user function).

  - Question Display

    Question heading; Info text; Question text, Answer field/option, Justification text field; option to delete (change) a given answer, visual indication of the question perspective

  - Additional Options, Tools, and Resources

    Option to attach (upload) document files with an answer; Listing of such attached files (including links) underneath the question panel; Option to send a delegation request for the current question to another actor; Option to inspect additional file- and web-resources specified during the authoring of the question; Button to show or hide the afore-mentioned options; Button to cycle through the current sub-set of questions selected

  - Custom Questions Editor

    Tool for creating a custom question (Task association; Recipient(s); Subject; Question text) and target this to another user, or all existing users of a particular role

  - Completion Bar

    Display of answering progress for the currently selected subset of questions

  - Filters

Filters to select a subset of question from the pool (similar to the topic dashboard but faster access suited for routine users of the system); Filtering by Task, Topic, and Aspect; Quick link back to the topic selector tool.

- Question Navigation Tree

  Hierarchical, expandable/collapsible representation of the currently selected subset of questions, categorised by Topic and Aspect, including any custom questions (at the end of the tree); Direct selection and display of questions by clicking on the elements of the tree; Indication of answering progress (colour change of tree elements, visual "ticking off" of questions).

4.1.4 Assessment Reporting Unit

- Different types of reporting documents, depending on user function
  - Summary of the case plus the current user's personal contributions (questions answered, answers given, questions delegated, and custom questions asked).
  - Assessment report containing comprehensive information about the case, including analysis and scores based on the answers given by all actors involved, and an appendix of all questions considered and answers collected.
- WYSIWYG-style report editor for the assessment leader:

  Chapter selection links (introduction + one chapter for each defined task); Automatic inclusion of assessment case configuration information in the introduction; facility to add a custom introduction; Display of all assessment questions answered, the specific answers given by the actors (including links to any files attached), ordered by topic and aspect, including custom questions (at the end of each chapter); Indication of agreement, conflicts, or missing information for each question; Facility to enter a summary statement for each chapter to include into the assessment report; Button to generate the assessment report document (in a separate window) with the information provided.
- Compiling of a printable assessment report / personal summary:

  Automatic generation of the chapters; Inclusion of all information provided during report editing; Calculation and visual representation of assessment scores for completion, actor involvement, and participation – also differentiated by perspective and task; Appendix of all questions posed and answers given by the actors involved.

4.2 Administration Level

4.2.1 Question Pool Management

- Question overview and filters
- Comprehensive authoring interface for creating, editing, and deleting assessment questions.
    - Context specification:

      Topic groups, topics and aspects (select or create new)
    - Content specification:

      Heading, info text, question text, answer type, perspective, task, supplementary files or web resources (select, specify, or upload), sequencing
    - Relevance criteria specification:

      SMT groups, SMT types, Actor roles, specific conditions, sequencing

4.2.2 User Management

- User accounts overview
- Comprehensive management interface for the creating or editing of user accounts:

  Surname; Forename; User ID; User Email address; User organisation; User type (Administrator, Developer, Contributor); Account activation/ deactivation; Reset of account password; Sending of welcome-emails.

4.2.3 Advanced Database Options

- Overview of available commands
- Clearing of Assessment Cases:

  Details and Confirmation page
- Clearing of Assessment Questions:

  Details and Confirmation page
- Clearing of Topics and Aspects:

  Details and Confirmation page
- Performing a complete reset:

Details and Confirmation page

- Editing of Library Categories:

  Options to Rename; Create; Delete

- Editing of Tasks:

  Options to Rename; Create; Delete

- Editing of Perspectives:

  Options to Rename; Create; Delete

- Editing of Actor Roles:

  Options to Rename; Create; Delete

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[5] SIAM D11.1 Report: The SIAM Assessment Support System: Initial Application and Database Specification

[6] Request for information #1: System Users, 20/09/2011

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[8] Request for information #3: Actors, Roles, Ass. Criteria, Questions, 07/09/2012

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[11] SIAM D2.3 - SMT and CIT Typologies

[12] SIAM D3.6 - Updating the SIAM Application Requirements – WP 3

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[19] SIAM D10.4 - Updating the SIAM Application Requirements – WP 10

Appendices

Appendix A: SIAM AST Administration Console – User Manual

SIAM AST

Administration Console

User Manual

20 February 2014

DR RONALD R. GRAU

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1. Introduction and Question Authoring Concepts

This document contains instructions for a web-based tool that allows users to design the screens which present those assessment questions, control their presentation, and assign further relational information for the analysis of any answers collected in the toolkit's assessment report. This administrative tool, originally built for project partner contributions to a request for information, has been further developed into an Administration Console for the SIAM AST. It is an administrator level program and its purpose is to allow the modification of the core data which sits at the heart of the system, with the pool of assessment questions being one part of this core. Whilst the document focuses on the tools available for authoring assessment questions, brief details are also given on the tools available for user administration and advanced options (These additional tools are largely self-explanatory). Normal end users (assessment participants) of the SIAM AST will usually not operate this tool. These users will log in to a dedicated user interface to engage in an assessment (There they can enter own custom questions which are specific to a particular assessment case).

There is a comprehensive range of video tutorials, covering almost an hour of illustrated explanations, and detailed How-To-walkthroughs for different features of the tool, in particular the authoring of questions. Access the entire range of video tutorials here: http://www.youtube.com/playlist?list=PLDMjco4x4wUd_RAazIAriKfS9QA1kxU7f

Note that the tutorials refer to the original request for information (RFI#5), posed to the partners of the SIAM project. However, its practical content is still relevant for end users of the SIAM AST, as the question authoring functionality in the Administration Console is largely identical to the previous RFI#5 version of the program.

1.1 About Screens and Screen Groups

The SIAM AST data structures for assessment questions organise all data input around two major concepts: ***screens*** and ***screen groups***.

A ***screen*** contains 1) textual information which a user may see when presented with a *single question*, including a question heading, an introductory text, and the actual question text. A screen also has 2) configurational and relational information which includes the type of answer expected, the particular STEFi assessment perspective addressed by the question, the task to which a question belongs, or any supplementary documents that should be presented when the screen is shown. Each screen has a specification of the

SMTs to which it applies and the actors to which it should be shown. The presentation of a screen can also be configured to depend on a specific answer given to a previous question (see 3.3 for more details).

A ***screen group*** is a container for one or more screens and defines the joint context (topic + aspect) for the questions displayed by any of the screens it contains. There may be many screen groups that have the same combination of topic and aspect, yet different questions in them. The purpose of screen groups is to organise those questions that are closely related to each other and allow additional constraints to be defined for their presentation (Figure 10).

Firstly, all screens in a screen group *can be ordered* to be presented in a particular sequence. This allows for the formulation of several questions to explore and assess the same issue, for instance going from a very general question to more specific ones.

Secondly, screens that reside within the same screen group can have *additional conditions* that control their presentation, based on answers given to previous questions in that group. For instance, there could be an initial Yes/No question, followed by another which elicits more details. If both questions sit in the same group, a condition can be put on the second question to be shown only if the answer to the first question was "Yes".

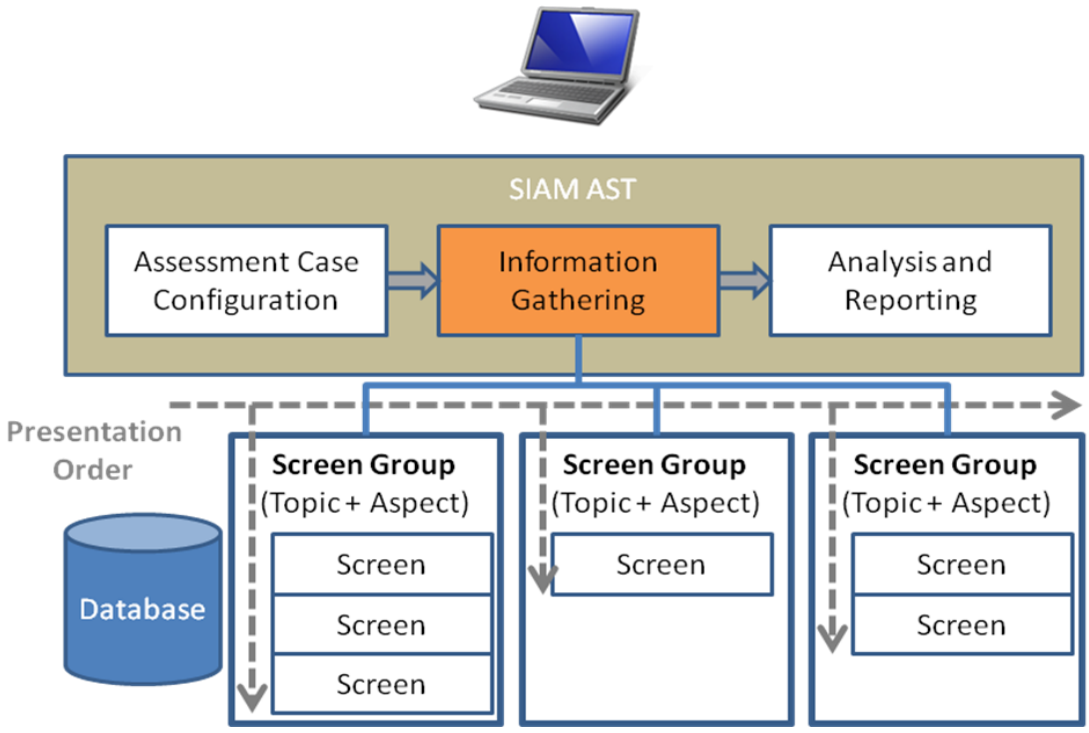


Figure 10: Screen Groups and Screens in the SIAM AST

When selecting a question for presentation to some user, the SIAM AST will first select all available screen groups based on their context definition, and then further evaluate whether any questions that reside within these groups should be shown.

Entering the required information to create a question involves three steps, which are detailed in the following sub-sections.

1.2 Screen Group Context

This term relates to selecting a combination of

1) a ***topic*** and
2) an ***aspect***

to set the context for a question. As screens (which contain individual questions) are always organised within screen groups, independent of whether there is a single question or several questions in a group, the context is a technical attribute of the screen group.

For example, one possible context for questions about freedom infringement is the topic “Bodily Integrity“, and its dependent aspect “Intrusiveness”.

1.3 Screen Content

This is relates to all information that directly defines a screen:

1) A heading
2) An info text
3) A question text
4) A question type
5) A STEFi perspective
6) A related task
7) Any supplementary information that should be provided to the user

1.4 Screen Relevance

Screen relevance settings can be made to control the presentation of a screen. All screens, including those which reside in the same screen group, can have their individual relevance settings.

These include

1) SMT groups and –types for which the questions should be considered by the toolkit.
2) Particular actors to which the question should be shown
3) Conditions to make presentation of a screen dependent on the answer given to a previous question in the same group.

2. Access, Workspace Areas and Navigation

2.1 Basics and Layout

Apart from the home page, all editing tools in the Administration Console share a similar work space layout:

1) A header bar
2) A navigation and control panel on the left-hand side
3) A main work area to the right of the control panel

2.1.1 Access and Home Page

You can access the Administration Console through the main login page of the SIAM AST (click the respective link which sits underneath the login input fields). You will then be re-directed to a different page to login to the administrative interface (Figure 11).

Figure 11: Administration Console Login

After the system has been newly set up, the default login is admin/admin. You can create additional users with the Administration Console, but note that only users of type “Administrator” or “Developer” can access the Administration Console.

2.1.2 Header Bar

The header bar is a simple heading display: It tells what tool is currently in use (Core Data) and what you are currently doing (Create or Edit Question).

2.1.3 Navigation and Control Panel

This part on the left-hand side is the primary means for navigation. It provides a range of “Actions” suited for the current input screen, filters for the overview table, as well as contextual information and tools for editing screens (Screen group context, order of questions, special commands).

Note that clicking on any of the links shown in this panel will save any entries made before going to the selected destination, except for “Cancel” commands.

2.1.4 Main Work Area

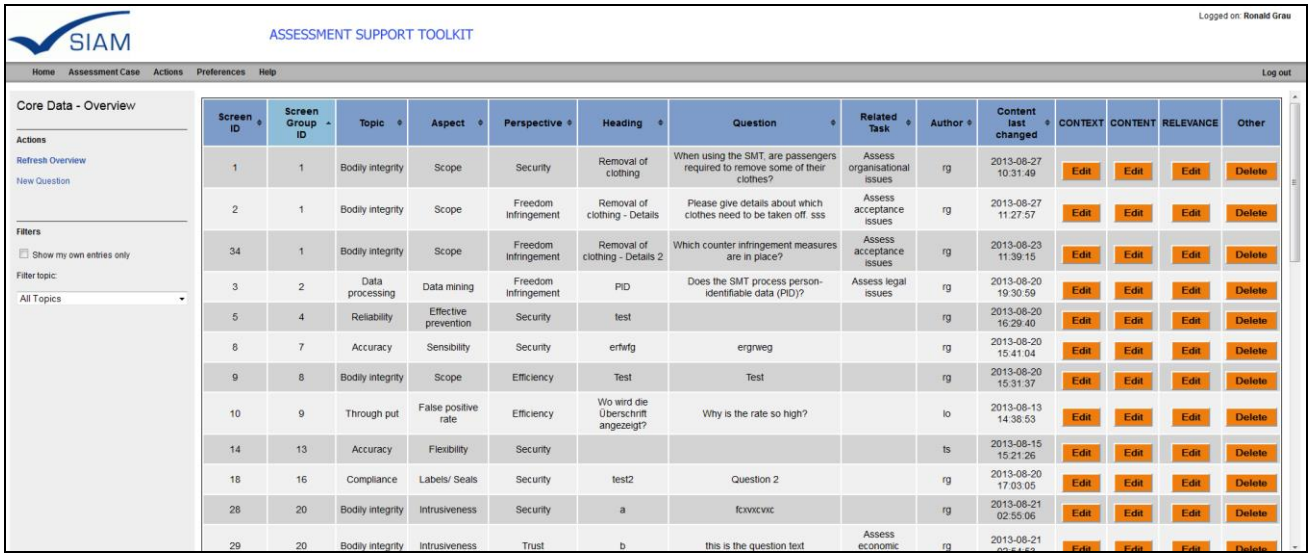
This is where data is displayed (Overview table) or entries made (e.g., Context, Content, or Relevance). In the data input pages, there may be buttons at the bottom of the page – these are just there for convenience and usually have the same function as the “Actions” in the Navigation and Control Panel. When entering a new question, there are special buttons that allow you navigate to the next entry step.

2.2 Question Authoring Specifics

Throughout the process of creating or editing screens, there are one overview and three main input screens corresponding to the descriptions in section 1.2 – 1.4. All three need to be edited or configured to prepare a question for presentation on screen.

2.2.1 Overview Page

This is the first page presented upon entering the tool. It shows a table in the main work area, listing details of any screens which have been set up thus far.



Screen ID	Screen Group ID	Topic	Aspect	Perspective	Heading	Question	Related Task	Author	Content last changed	CONTEXT	CONTENT	RELEVANCE	Other
1	1	Bodily integrity	Scope	Security	Removal of clothing	When using the SMT, are passengers required to remove some of their clothes?	Assess organisational issues	rg	2013-08-27 10:31:49	Edit	Edit	Edit	Delete
2	1	Bodily integrity	Scope	Freedom Infringement	Removal of clothing - Details	Please give details about which clothes need to be taken off. sss	Assess acceptance issues	rg	2013-08-27 11:27:57	Edit	Edit	Edit	Delete
34	1	Bodily integrity	Scope	Freedom Infringement	Removal of clothing - Details 2	Which counter infringement measures are in place?	Assess acceptance issues	rg	2013-08-23 11:39:15	Edit	Edit	Edit	Delete
3	2	Data processing	Data mining	Freedom Infringement	PID	Does the SMT process person-identifiable data (PID)?	Assess legal issues	rg	2013-08-20 19:30:59	Edit	Edit	Edit	Delete
5	4	Reliability	Effective prevention	Security	test			rg	2013-08-20 16:29:40	Edit	Edit	Edit	Delete
8	7	Accuracy	Sensibility	Security	erfwfg	ergrweg		rg	2013-08-20 15:41:04	Edit	Edit	Edit	Delete
9	8	Bodily integrity	Scope	Efficiency	Test	Test		rg	2013-08-20 15:31:37	Edit	Edit	Edit	Delete
10	9	Through put	False positive rate	Efficiency	Wo wird die Überschrift angezeigt?	Why is the rate so high?		lo	2013-08-13 14:38:53	Edit	Edit	Edit	Delete
14	13	Accuracy	Flexibility	Security				ts	2013-08-15 15:21:26	Edit	Edit	Edit	Delete
18	16	Compliance	Labels/ Seals	Security	test2	Question 2		rg	2013-08-20 17:03:05	Edit	Edit	Edit	Delete
28	20	Bodily integrity	Intrusiveness	Security	a	fcxvxcvxc		rg	2013-08-21 02:55:06	Edit	Edit	Edit	Delete
29	20	Bodily integrity	Intrusiveness	Trust	b	this is the question text	Assess economic	rg	2013-08-21	Edit	Edit	Edit	Delete

Figure 12: Overview Page

One the left-hand side, the navigation and control offers options to refresh the table (to display any entries that may have been made by other users since the last refresh). Further, there are a couple of filters to limit the table display to one's own entries (based on the user name currently logged on), or single topics. Clicking on "New Question" will trigger a data input wizard which takes the user through the three steps required to set up a question: Context, Content, and Relevance.

On the right-hand side, the table provides buttons that allow editing context, content, and relevance for existing screens /screen groups. User can also choose to delete screens, if necessary. However for contributors this option is limited to those screens they have created themselves.

2.2.2 Screen Group Context Page

Before a question can be entered, you must select the topic and respective aspect that forms the context of that question.

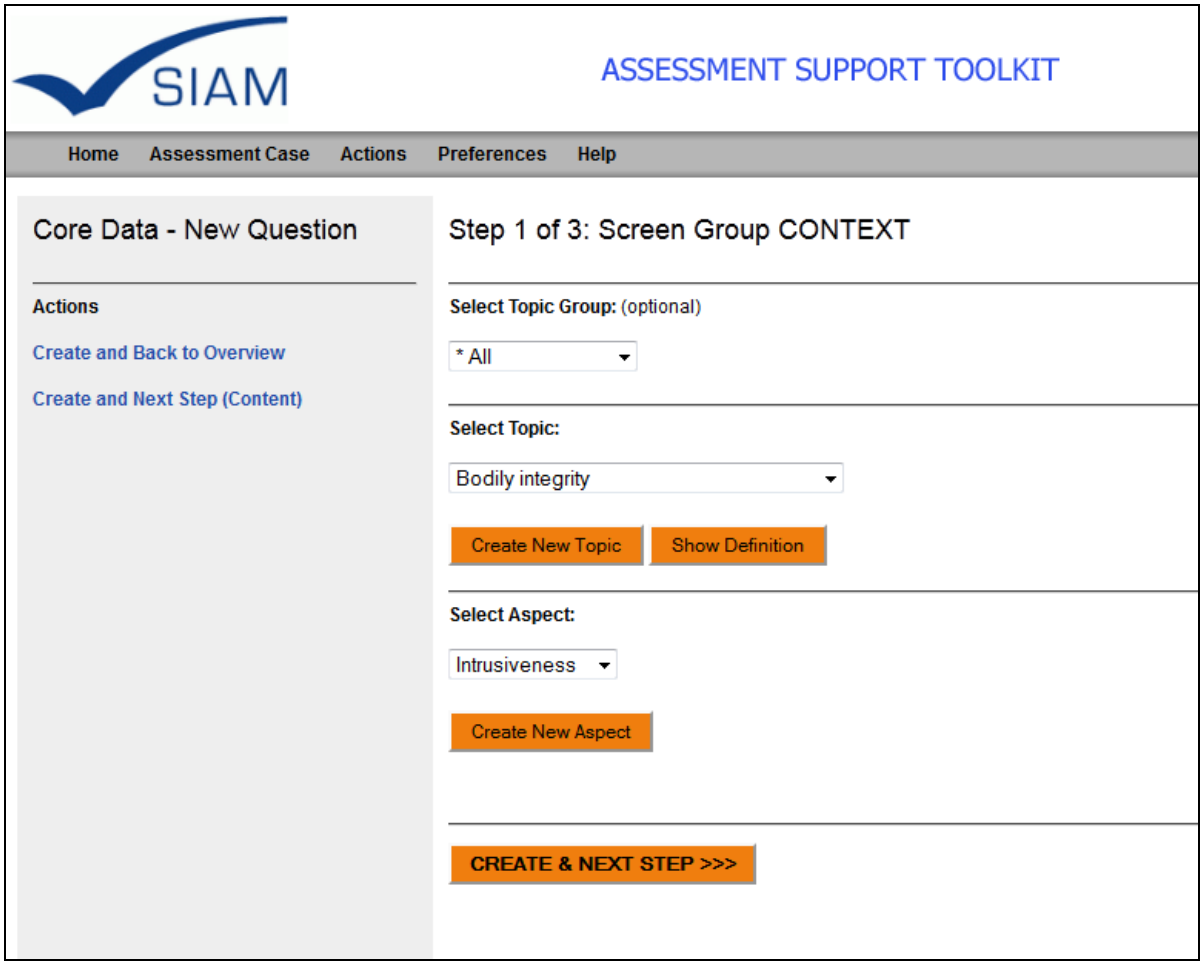


Figure 13: Step1: Create a Screen Group

This page has 3 drop-down menus for selection: Topic Group, Topic, and Aspect.

Topic Group: This is an optional selection, its purpose being to allow a user to find particular topics easier, e.g. selecting "Infringement" will limit the selectable topics to those primarily to do with infringement.

If unsure about which group your desired topic may be located in, leave this at the "* All" -setting.

Topic: Select the main topic context for the question to be entered in the next step. Selecting a topic will limit the subsequent selection of aspects to those defined for the topic. For instance, selecting any freedom infringement type will limit the available aspects to the normativity dimensions (Scope, Intrusiveness, Coerciveness, and Distribution). Selecting what was previously called an "Assessment Criterion" as a topic will limit the aspects to its "attributes".

Buttons:

"Create New Topic" will open a popup window allowing you to define an entirely new topic and its definition. Note that the topic will be placed in the currently selected topic group – if you don't want to associate your new topic with any group, leave the topic group at the "* All" setting before clicking this button.

"Show Definition" will display the definition of the topic currently selected. Note that most predefined topics don't have a definition yet (These will be inserted into the database at a later stage)

Aspect: This will display the particular assessment aspects or attributes belonging to a topic selected previously.

Note that a topic and its aspect need to be selected before a question group can be created, and subsequently, a question put in this group.

Button:

"Create New Aspect" will open a popup window allowing you to define a new aspect for the selected topic.

2.2.3 Screen Content Page

Here, you can edit the contents of a screen. A screen corresponds to a single question. In the navigation and control panel on the left, you see the screen group context set for the current screen.

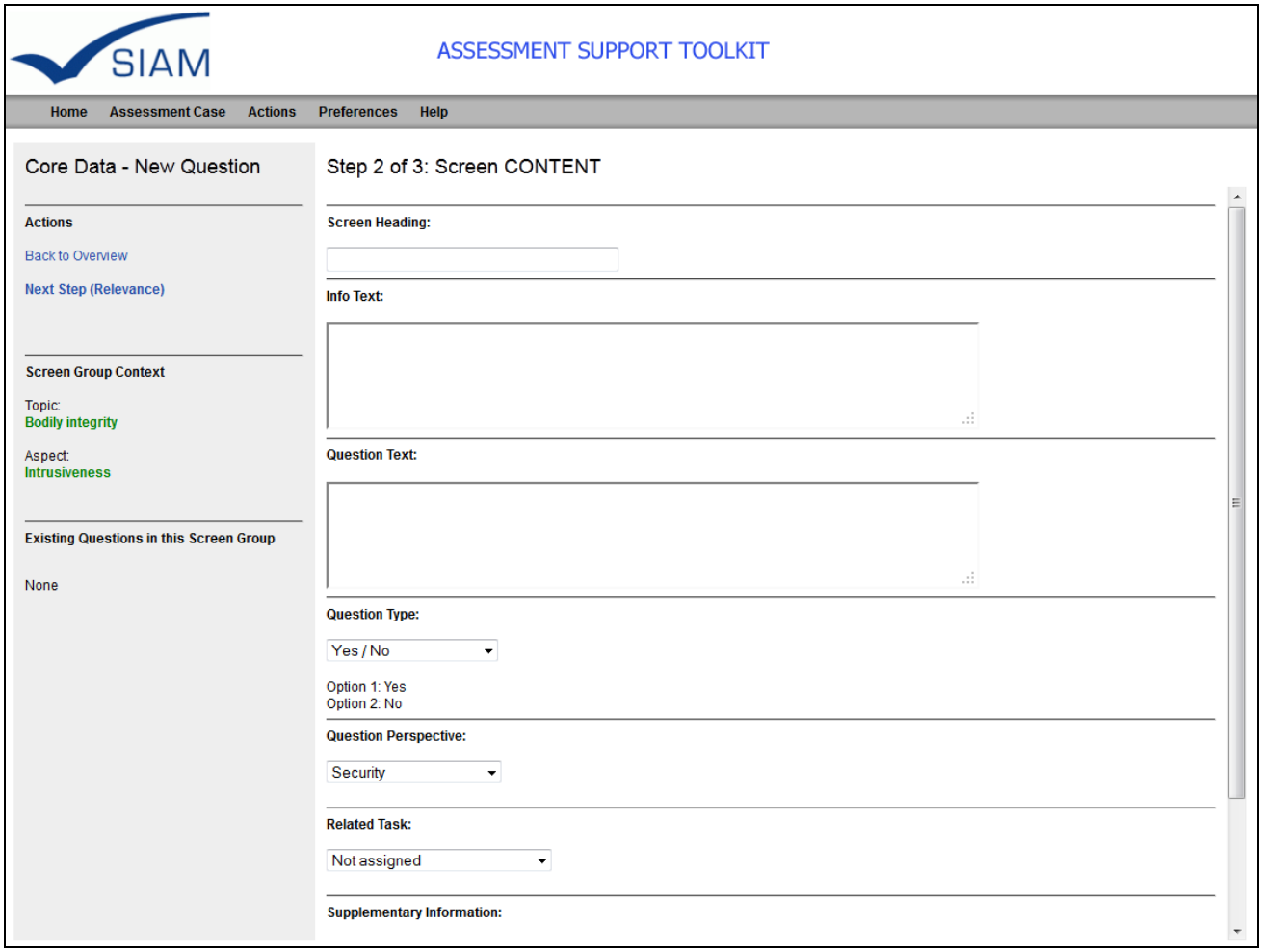


Figure 14: Step 2: Edit the Screen Content

As outlined in section 1.3, screen content comprises:

1) **Heading**

   This is the title of the screen, and will be displayed in addition to the topic + aspect of the question. Keep it short.

   Entering a heading is particularly useful if you have more than one screen in the current screen group, as it makes identifying the different screens easier when setting the order of their presentation (Section 3.4).

2) **Info text**

   This text will displayed before the question. It could be used as an introduction, or to give instructions to the end user on how to answer the question in this screen.

3) **Question text**

   This is the actual question. Please consider the question type when formulating the question text (next).

4) **Question type**

Choose one of the question types provided. Consider that this will determine how users can answer the question, and how answers for this question can be summarised in the assessment report.

Every question can only have one answer type. If you discover you would like to elicit several types of answers for a particular issue, this indicates that several, specific questions are needed. Add separate questions (i.e. screens) for every type of answer desired.

5) **Question perspective**

Every question explores one particular assessment perspective (one out of STEFi). Choose the one that applies. If you think a particular issue may be assessed from different perspectives, add additional questions (i.e. screens) to make these explicit.

6) **Related task**

Every question may be associated to a particular task. Depending on the answers given by the end users, it can later be determined in the assessment report to what extent these tasks have been addressed. Select the one that applies or leave unassigned.

7) **Supplementary information**

Files and web links are presented as a reference to end users when the question is displayed in order to help them answer it. You can add web links or upload files such as PDF, images, Word documents, or spread sheets. As long as the SIAM AST is hosted at the Kingston University web space, make sure the file size does not exceed 2MB. We hope this can be increased later.

2.2.4 Screen Relevance Page

In this part, the presentation of the screen can be configured. At the top of this page, the heading, info text, and question text entered as content is displayed as a summary.

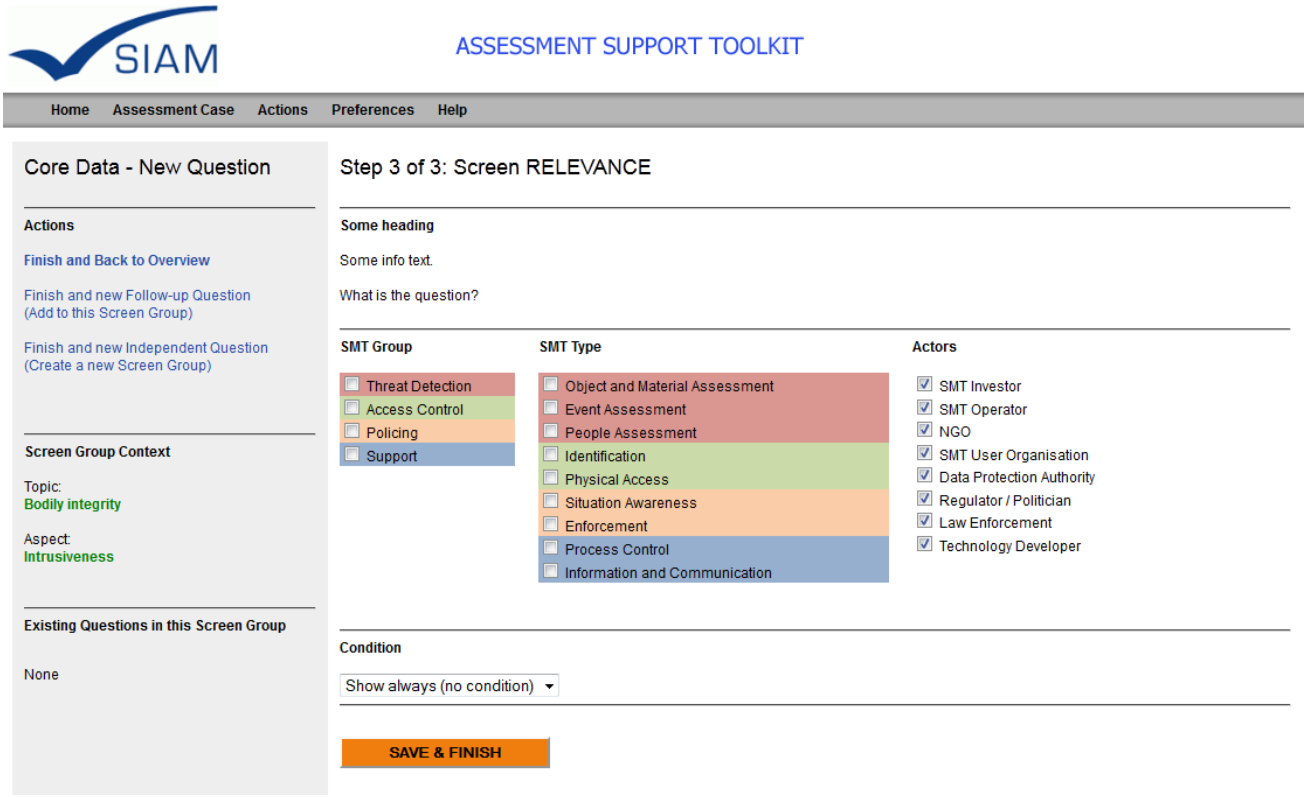


Figure 15: Step3: Configure Screen Relevance

SMT Group / SMT Type

Select the SMTs for which the question should be displayed. The relation between SMT groups and their SMT types are coded by colour. Clicking an SMT group will de-/select all corresponding SMT types.

Actors

Select the types of Actor who should see your question (By default, all actors are enabled).

When an assessment case is set up and different questions displayed, the various assessment participants logging on to the AST will have one of the actor types listed assigned to their user account. The system will then determine which questions to show to a user based on the selection made in this section.

Condition

If you have more than one question in a single screen group, it is possible to set up conditions here.

See section 3.4.3 for more details.

3. Question Authoring: How-To

The SIAM AST uses a pool of pre-defined assessment questions to display to any users of the toolkit which engage in assessment cases. Administrators can modify the question in this pool.

3.1 Manage Question Pool

On the home page, click the link “Manage Question Pool”. This will take you to the set of available question authoring tools.

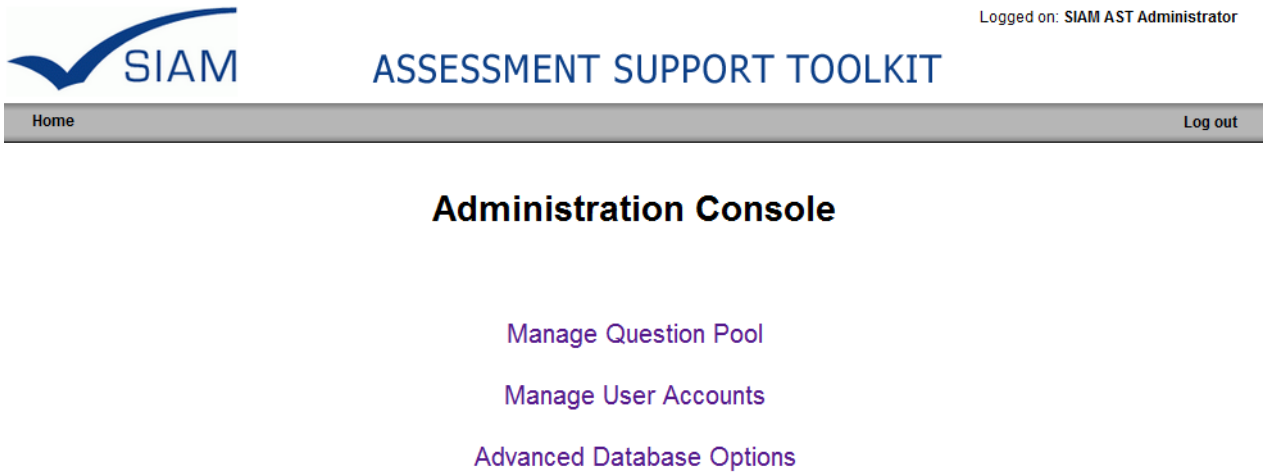


Figure 16: Administration Console Homepage

3.2 Create a New Question

On the overview page, click on “New Question” to start the data input wizard. The wizard will walk through the main steps as outlined in the subsequent sections, eliciting the necessary inputs on the way. The following subsections briefly outline the major steps that need to be carried out. More details on the individual pages can be found in section 2.2. Also note that there video tutorials for each page.

3.2.1 Step 1: Set the Context of the Screen Group

See the tutorial video here: http://youtu.be/GkZnkcrWtcE

1. Select a topic
2. Select an aspect

3. Click “Create & Next Step”

3.2.2 Step 2: Enter the Content of a Screen

See the tutorial video here: http://youtu.be/QmUhLdvsiAw

1. Enter a heading
2. Enter info text, if applicable
3. Enter the question text
4. Set the question type
5. Select question perspective
6. Select related task
7. Add supplementary information
8. Click “Save & Next Step”

3.2.3 Step 3: Configure the Relevance of a Screen

See the tutorial video here: http://youtu.be/CP1AcxHYF4Q

1. Select all SMT groups and/or types that apply to the question.
2. Deselect all actors who should not see the question.
3. Setup a condition that needs to be fulfilled for the question to be shown. This feature is only useful if there are at least two questions in the screen group. See section 3.4 for more details.

Upon finishing all selections, there is a choice to either

1) Click the “Save and Finish” button or the “Finish and go back to the overview” link. This will save any entries made on the last wizard page and load up the overview table.
2) Enter a new independent question (Link in the lower left of the navigation panel) This will restart Step 1 of the wizard, i.e. create a NEW screen group, and a NEW question within this group. This is useful for entering many independent questions quickly, one after the other.
3) Enter a follow-up question (Link in the lower left of the navigation panel) This will go to Step 2 of the wizard, prompting you to enter a NEW question within

THE SAME screen group. This is useful for specifying a set of question which depend on each other in terms of mutual conditions, or the sequence of presentation.

See Figure 17 below for an overview of the wizard navigation logic.

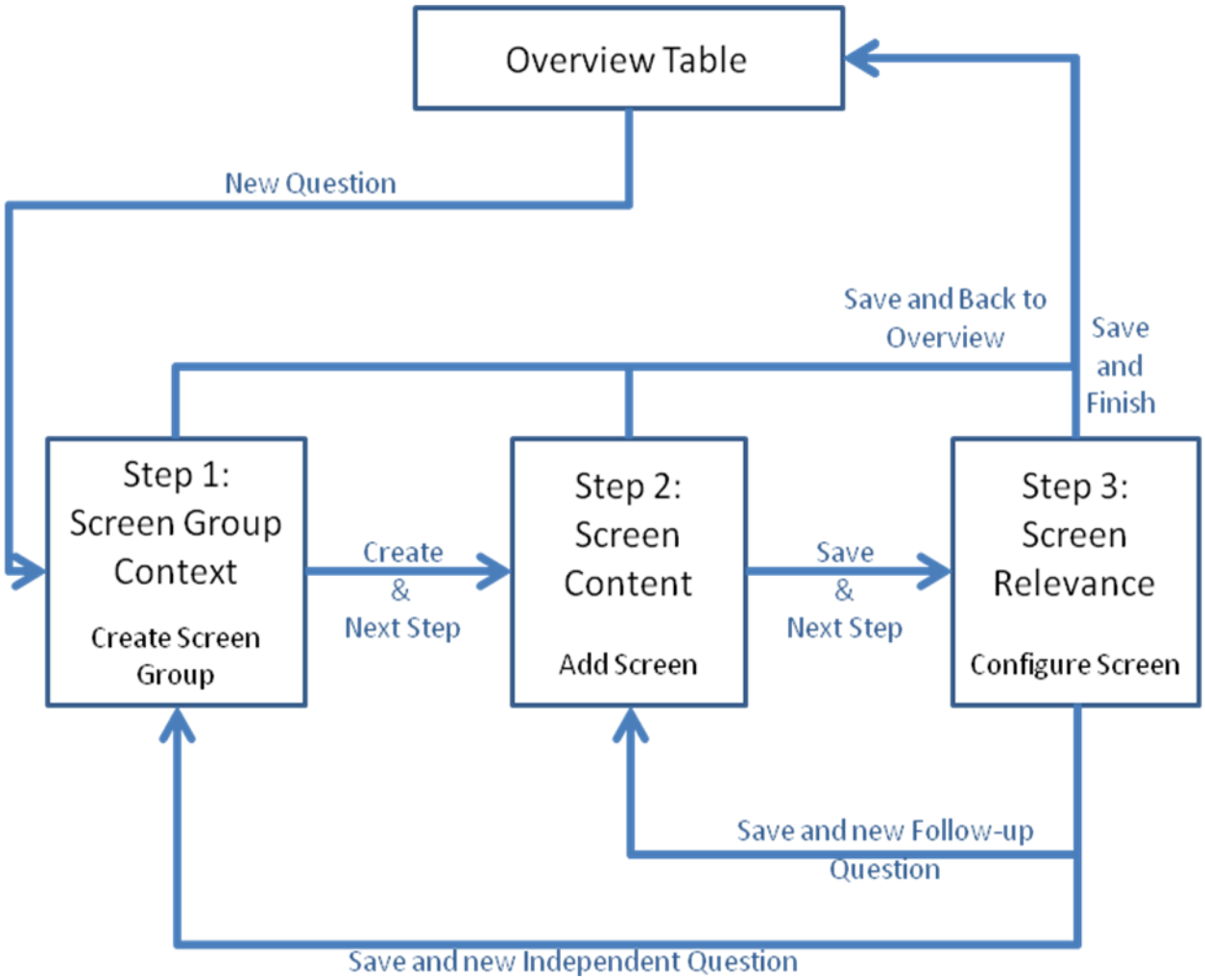


Figure 17: Navigating through the Data Input Wizard

3.3 Edit Existing Questions

See the video tutorial here: http://youtu.be/_HMJvXmhMoI

The core data tool allows editing all elements of any questions which have been created previously. Some special functions, like the ordering of screens that reside within a screen group, are only available when editing screens (see section 3.4).

Overall, the screens for editing are structured exactly as the data input wizard pages and look more or less the same, yet are accessible individually. Hence, they can be operated in the same way as the data input wizard.

3.4 Work with Screen Groups

In principle, there is no problem in adding only single, independent questions into the database. Technically, these then constitute a series of screen groups with every group carrying a single screen (=question) each (cf. Figure 10).

However, screen groups have been designed to be capable of containing more than one single screen, which provides some interesting features for entering more sophisticated question structures. As introduced in section 1.1., having more than one question in a screen group allows these screens 1) to *be ordered in a sequence*, and 2) *to be extended with conditions* that control their presentation, based on the answers given to previous questions in that group.

3.4.1 Add a Question to a Screen Group

See the tutorial video here: http://youtu.be/zfujrkcptOQ

In the overview page, clicking "New question" will create an entirely new screen group containing a new question. Adding any follow-up questions to an existing screen group can be done either

1. In the *Screen Relevance* part (Step 3) of the data input wizard, i.e. right after one brand new question has been completely specified. To do so, click the link "Enter new Follow-up Question (Add to this Screen Group)" in the navigation and control panel.
2. When *editing* the *Screen Content* or *Screen Relevance* pages, by clicking the same link (further down, in the lower left part of the screen).

3.4.2 Change the Presentation Order of Questions in a Group

See the tutorial video here: http://youtu.be/ZpwNvJ92bEI

The navigation and control panel has a section "Questions in this screen group" which allows quick switching between questions specified within a single group and changing their presentation order. (Available when *editing* the *Screen Content* or *Screen Relevance* pages of a question.)

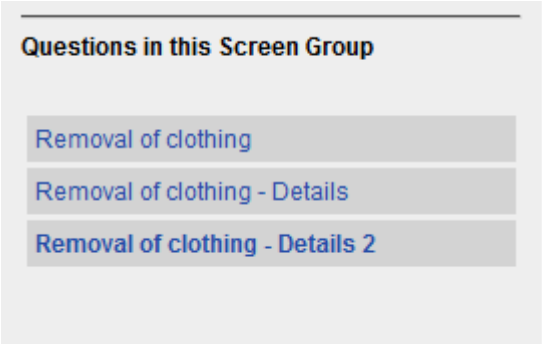


Figure 18: Quick-switch and Reposition the Order of Questions within a Screen Group

Simply point to one of the grey bars, and left-click to load the current editing page for a particular screen. Left-click and hold, and drag the grey bar above or below any of the others to reposition. When the mouse button is released, the grey bar will fall into place at the indicated location. Clicking any of the links in the "Actions" section will save the specified order.

Note: If any of the grey bars says "Empty heading", then no screen heading was specified in the question's screen content page. To do so, left-click on the "Empty heading" link and

then on “Content” in the navigation panel, if necessary. Then specify a heading for the question. Upon saving the grey bar for that question will show the specified heading.
Note 2: Switching questions will automatically save your latest changes (Repositioning will not).

3.4.3 Set up Conditions for Questions in a Group

See the video tutorial here: http://youtu.be/zfujrkcptOQ

If a screen group contains at least two questions, conditions can be set between the questions that are presented in a particular sequence. Every question can have one condition, making its presentation dependent on the answer which was given to a previously presented question.

See Figure 19, for example. This shows a partial screen snapshot of the Screen Relevance page. On the left-hand side, it can be seen that there are three questions in the screen group: “Removal of clothing”, and two further questions asking for more details. The question displayed in bold font is the one which is currently being edited.

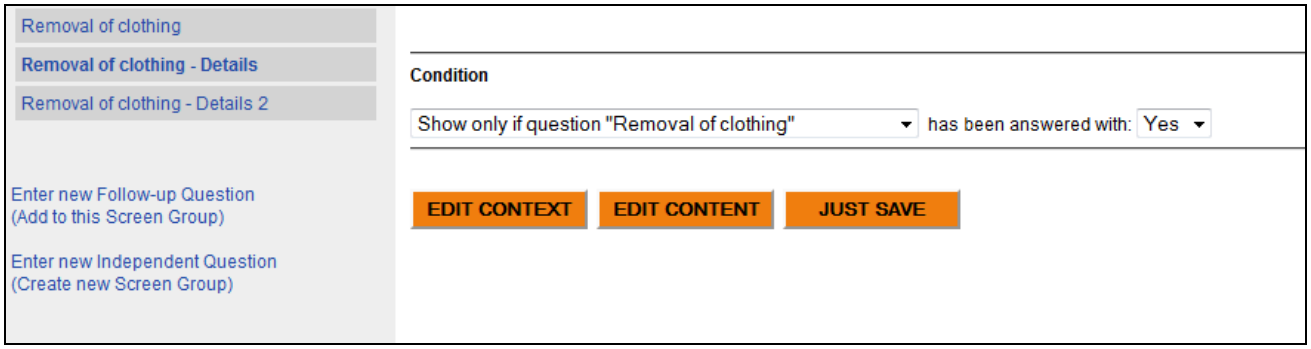


Figure 19: Setting Conditions on Questions

In this example, the condition has been set such that the first, main question needs to be answered with “Yes” for the second question to be displayed. In other words, the system will only ask for further details on the “Removal of clothing” issue, if this is in fact an issue, and skip the details questions otherwise.
In this general way, the display of questions within screen groups can be controlled based on the answers given by the end user to previous questions. This feature is particularly practical for using question sets which explore an issue from a general question towards more specific ones.

Note: When working with conditions, make sure your questions are put in the right sequence, and the initial question in a group is displayed unconditionally (to prevent locking out the entire screen group from presentation).

4. User Administration

Access the user administration tool by clicking “Manage User Accounts” on the console’s home page (Figure 16).

4.1 Overview

The overview page (Figure 20) provides a list of all SIAM AST user accounts, giving details on all associated information such as name, user ID, user type, user organisation, email address, relevant dates, as well as whether the account is currently active. Only active accounts can log in to the SIAM AST and/or the Administration Console.

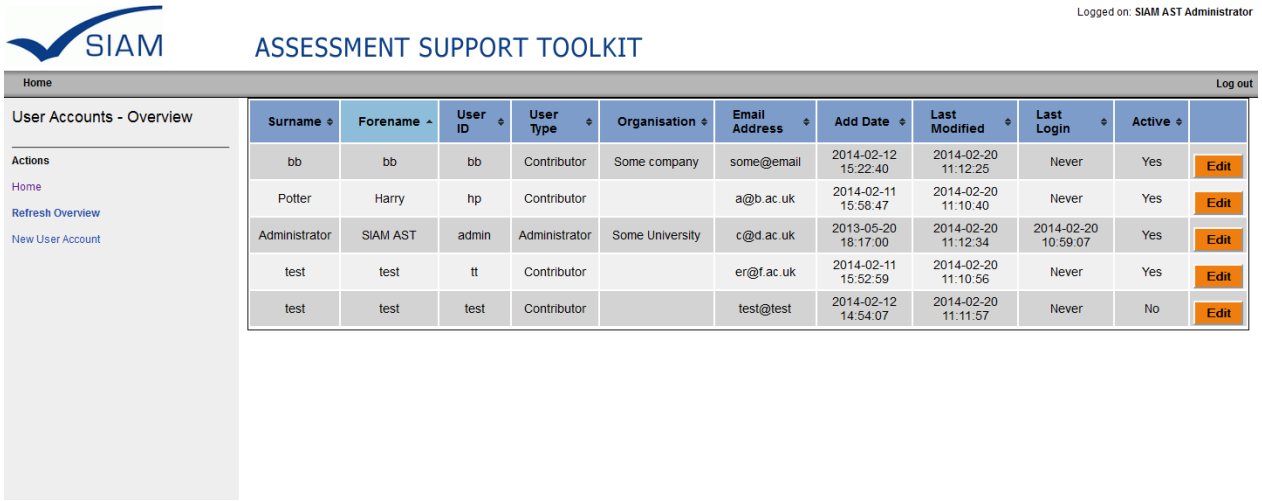

SIAM
ASSESSMENT SUPPORT TOOLKIT
Logged on: SIAM AST Administrator
Home
Log out
User Accounts - Overview
Actions
Home
Refresh Overview
New User Account
Surname
Forename
User ID
User Type
Organisation
Email Address
Add Date
Last Modified
Last Login
Active
bb bb bb Contributor Some company some@email 2014-02-12 15:22:40 2014-02-20 11:12:25 Never Yes Edit
Potter Harry hp Contributor a@b.ac.uk 2014-02-11 15:58:47 2014-02-20 11:10:40 Never Yes Edit
Administrator SIAM AST admin Administrator Some University c@d.ac.uk 2013-05-20 18:17:00 2014-02-20 11:12:34 2014-02-20 10:59:07 Yes Edit
test test tt Contributor er@f.ac.uk 2014-02-11 15:52:59 2014-02-20 11:10:56 Never Yes Edit
test test test Contributor test@test 2014-02-12 14:54:07 2014-02-20 11:11:57 Never No Edit

Figure 20: User Accounts - Overview

The page offers two significant actions

1) Create a new user account
2) Edit an existing user account

Note that single user accounts cannot be deleted, as these might be associated to existing assessment cases or data in the question pool. It is possible, however, to clear all user accounts once assessment cases and questions have been cleared from the database.[5]

4.2 Create a New User Account

[5] See the advanced database options, chapter 5.

A new user account can be created by clicking the action “New User Account” in the navigation and control panel on the left (Figure 20). A new page will open which provides the necessary input fields for entering the user information (Figure 21).

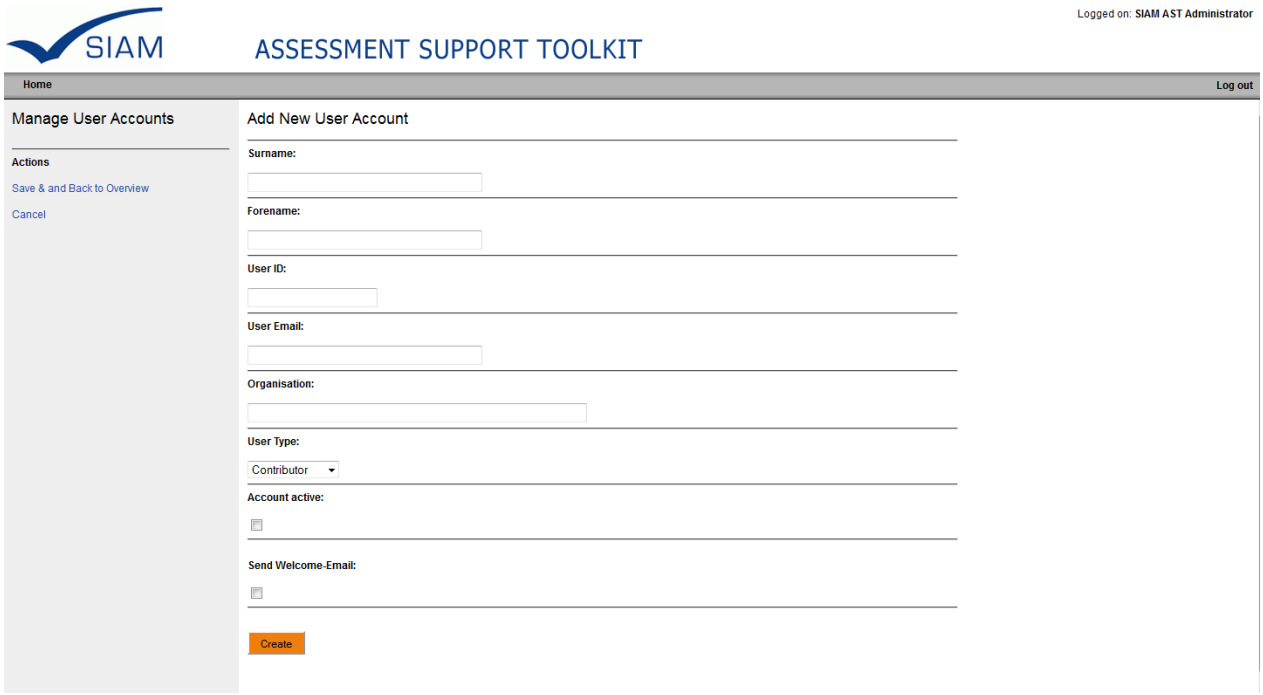


Figure 21: Create a New User Account

Upon specifying the user ID (and saving), the application will check whether this ID has already been assigned to a different user and prompt correction, if necessary. This is required to avoid duplicate login names.

User accounts need a user type specification. The SIAM AST currently offers three types:

1) Administrator
2) Developer
3) Contributor

For creating a normal SIAM AST user account, choose “Contributor” as type. The other types are only relevant for accessing the Administration Console.

If e-mail support has been activated in the application settings, there is an option to send a welcome email to the new user (using the stated email address)[6]. However, doing this is not required for creating a user account as such.

[6] See the SIAM AST Installation Instructions for details.

4.2 Edit an Existing User Account

By clicking the "Edit" button for a particular user account in the Overview page (Figure 20), the information associated to a user account can be changed as well. The respective page looks similar to that used for creating a new user but with all available information populated (Figure 22).

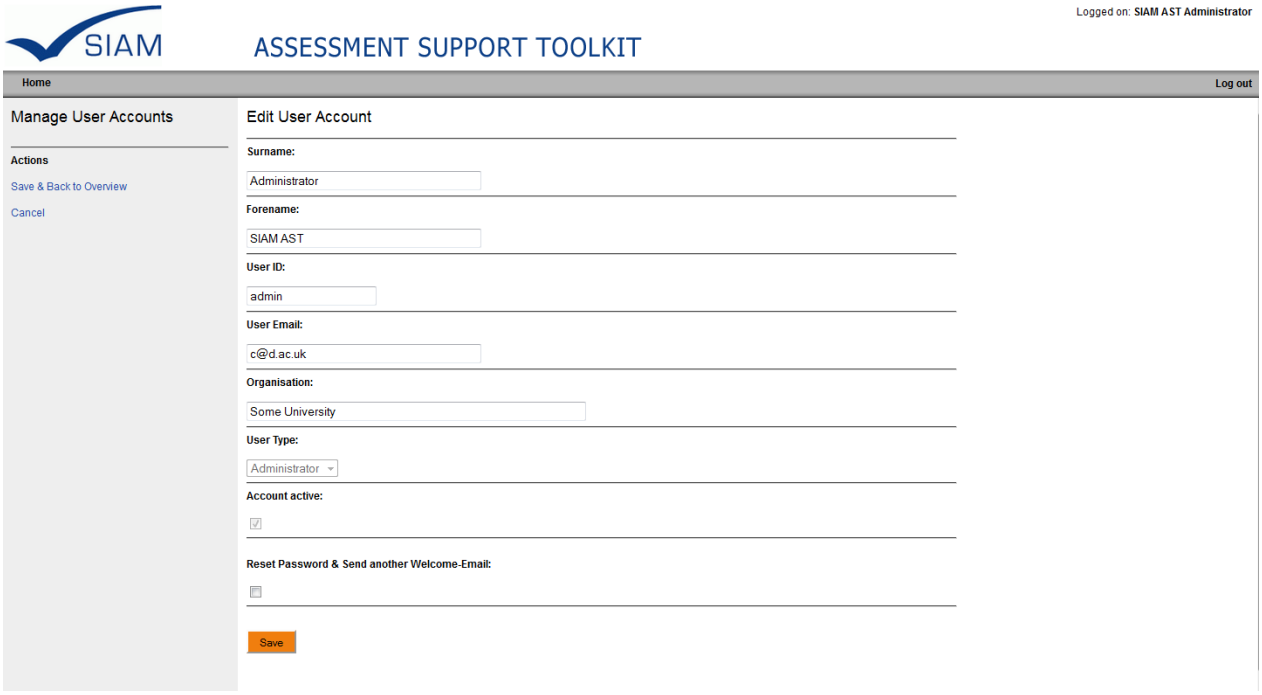


Figure 22: Edit an Existing User Account

Note that the application will prevent a console user to delete, or change the type of, a sole Administrator account. This is a safety measure to prevent any careless user from locking out by mistake the only available administrator account from accessing the system. However, if there is more than one user account of type "Administrator" specified in the system, these settings can be changed.

5. Advanced Database Options

The SIAM AST Administration Console offers advanced database options for making fundamental changes to the system's core data, including question pool, user accounts, assessment cases and related data, library categories, perspectives, tasks, and actor roles. These options can be useful to use the assessment support system for further research and apply its core mechanics and features to contexts other than those of the original SIAM project.
The feature set described in this chapter can be accessed by clicking “Advanced Database Options” on the console’s home page (Figure 16).

5.1 Overview

The available actions are listed in the navigation and control panel. Clicking on any of the actions for clearing database contents will display another page with details about what the action will do. As most of the clearing actions will make profound changes to the SIAM database, the user is required to explicitly confirm whether the action is to be carried out.

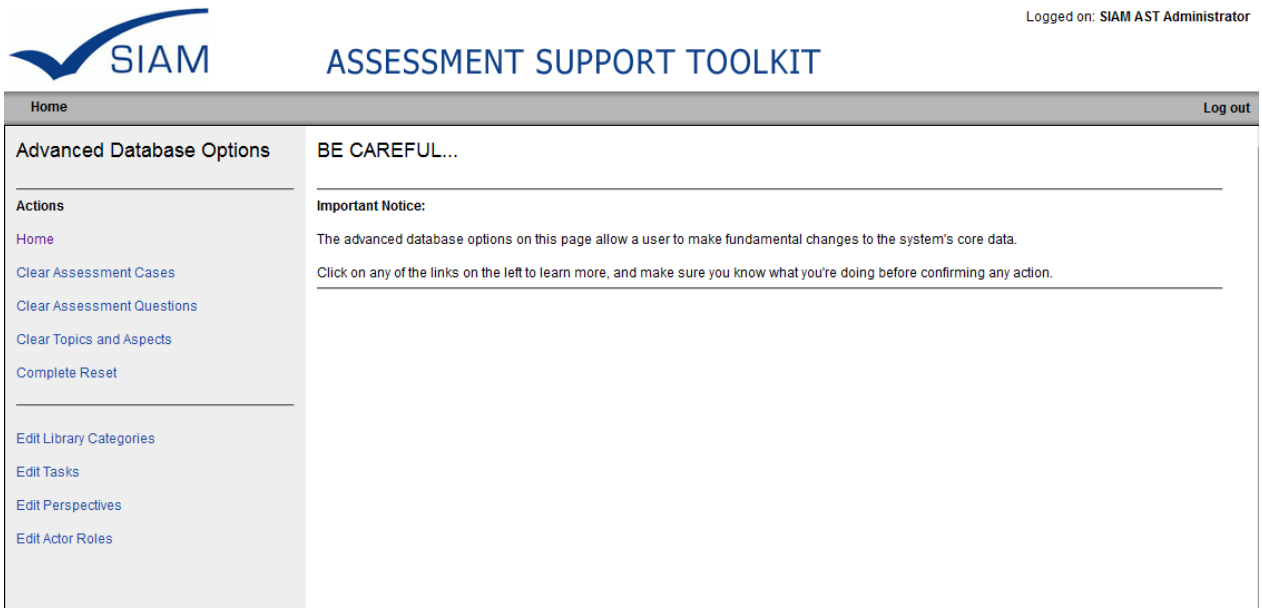

Logged on: SIAM AST Administrator
SIAM
ASSESSMENT SUPPORT TOOLKIT
Home
Log out
Advanced Database Options
Actions
Home
Clear Assessment Cases
Clear Assessment Questions
Clear Topics and Aspects
Complete Reset
Edit Library Categories
Edit Tasks
Edit Perspectives
Edit Actor Roles
BE CAREFUL...
Important Notice:
The advanced database options on this page allow a user to make fundamental changes to the system's core data.
Click on any of the links on the left to learn more, and make sure you know what you're doing before confirming any action.

Figure 23: Advanced Database Options - Overview

5.2 Clearing Assessment Cases

This action will delete all assessment cases from the database, including any answers given by participants. This action removes user-created assessment cases and answers, however the question pool and existing user database remains untouched so that new assessment cases can afterwards be created based on the original core data. When users log on to the SIAM AST after this action has been performed, their dashboard page will be empty.

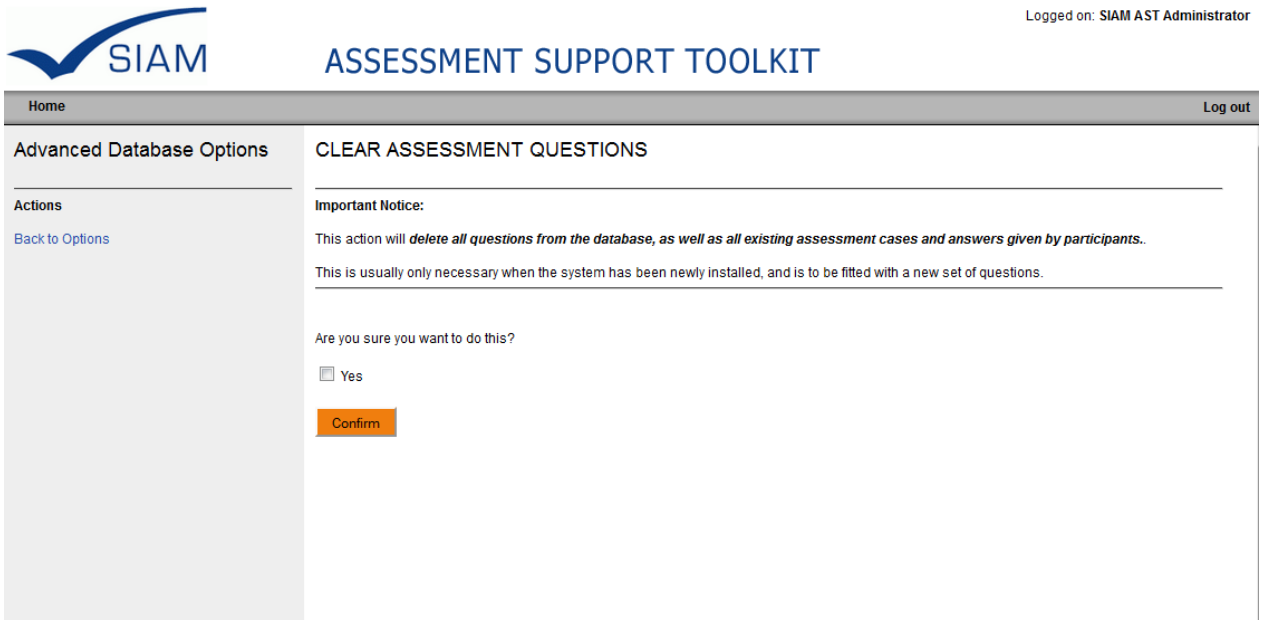

Logged on: SIAM AST Administrator
SIAM
ASSESSMENT SUPPORT TOOLKIT
Home
Log out
Advanced Database Options
Actions
Back to Options
CLEAR ASSESSMENT QUESTIONS
Important Notice:
This action will delete all questions from the database, as well as all existing assessment cases and answers given by participants..
This is usually only necessary when the system has been newly installed, and is to be fitted with a new set of questions.
Are you sure you want to do this?
Yes
Confirm

Figure 24: Advanced Database Options - Deleting Assessment Cases

5.3 Clearing Assessment Questions

This action will remove the standard question pool from the database, as well as all existing assessment cases and answers given by participants. The latter is necessary because there are active data links between the pool questions and existing assessment cases and related data which need to be removed as well.

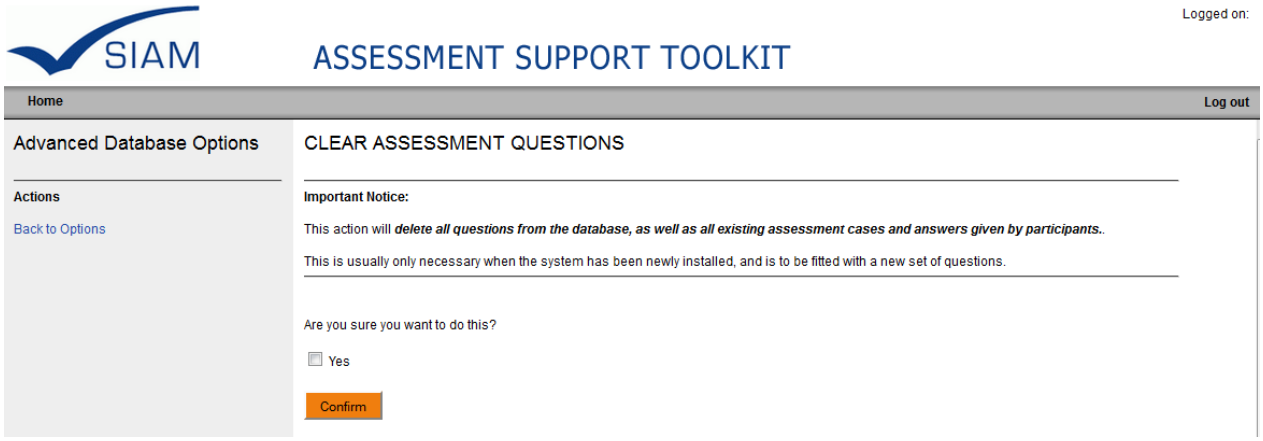

Logged on:
SIAM
ASSESSMENT SUPPORT TOOLKIT
Home
Log out
Advanced Database Options
CLEAR ASSESSMENT QUESTIONS
Actions
Important Notice:
Back to Options
This action will delete all questions from the database, as well as all existing assessment cases and answers given by participants..
This is usually only necessary when the system has been newly installed, and is to be fitted with a new set of questions.
Are you sure you want to do this?
Yes
Confirm

Figure 25: Advanced Database Options - Deleting the Question Pool

This action is usually only necessary when the system has been newly installed, and is to be fitted with a new set of questions.

5.4 Clearing Topics and Aspects

This action deletes all topics, aspects, and assessment questions from the database, as well as all existing assessment cases and answers given by participants. These data objects need to be cleared together because of active data links that exist between them in an installation.

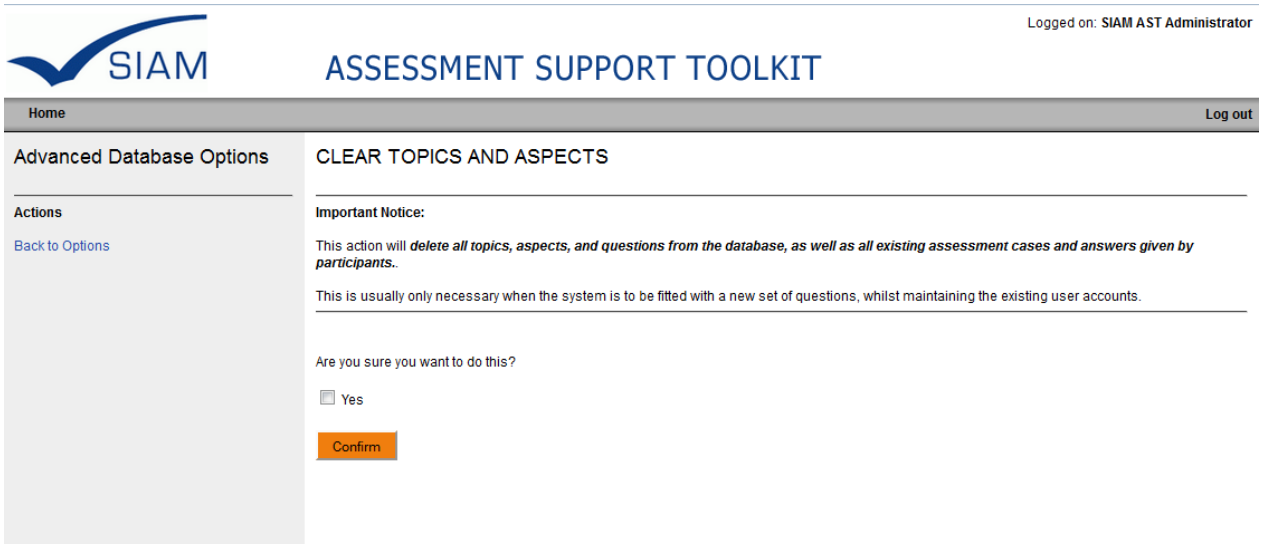

Logged on: SIAM AST Administrator
SIAM
ASSESSMENT SUPPORT TOOLKIT
Home
Log out
Advanced Database Options
CLEAR TOPICS AND ASPECTS
Actions
Important Notice:
Back to Options
This action will delete all topics, aspects, and questions from the database, as well as all existing assessment cases and answers given by participants..
This is usually only necessary when the system is to be fitted with a new set of questions, whilst maintaining the existing user accounts.
Are you sure you want to do this?
Yes
Confirm

Figure 26: Advanced Database Options - Deleting Topics and Aspects

This is usually only necessary when the system is to be fitted with a new set of questions, based on entirely new topics and aspects, whilst maintaining the existing user accounts. Afterwards, new topics and aspects can be created using the question authoring tool.[7]

5.5 Complete Reset

This action will delete all assessment cases, questions, answers, topics, aspects, files, web resources, and existing users from the database.

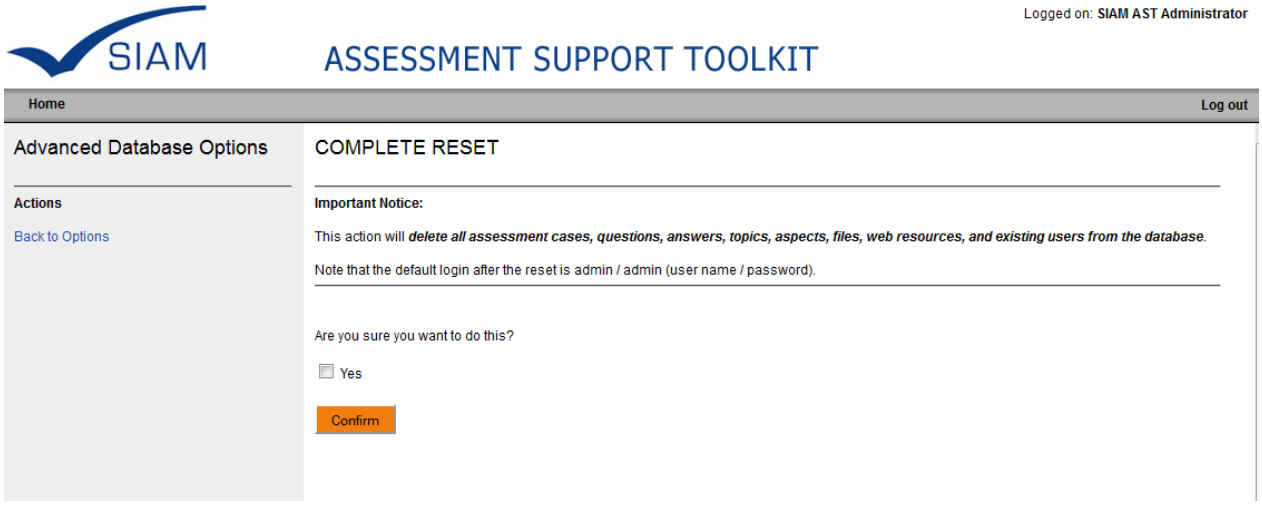

Logged on: SIAM AST Administrator
SIAM
ASSESSMENT SUPPORT TOOLKIT
Home
Log out
Advanced Database Options
Actions
Back to Options
COMPLETE RESET
Important Notice:
This action will delete all assessment cases, questions, answers, topics, aspects, files, web resources, and existing users from the database.
Note that the default login after the reset is admin / admin (user name / password).
Are you sure you want to do this?
Yes
Confirm

Figure 27: Advanced Database Options - Performing a Complete Reset

After the reset, only one user account will be present in the user database which acts as default Administrator. The login for this default account is admin / admin (user name / password).

5.6 Editing Library Categories

The SIAM AST organises all supplementary resources uploaded or specified during question authoring in a global library. User of the AST can access these resources from the main menu. When a user uploads such resources, they are asked to select a category into which the respective file or web resource will be placed. In order to prevent duplicates and make sure only sensible categories are used, users select from a list of predefined catego-

[7] See section 2.2.2

ries rather than specify such categories by themselves. However, the "Edit Library Categories" database option allows editing the list of categories which are available for selection during question authoring.

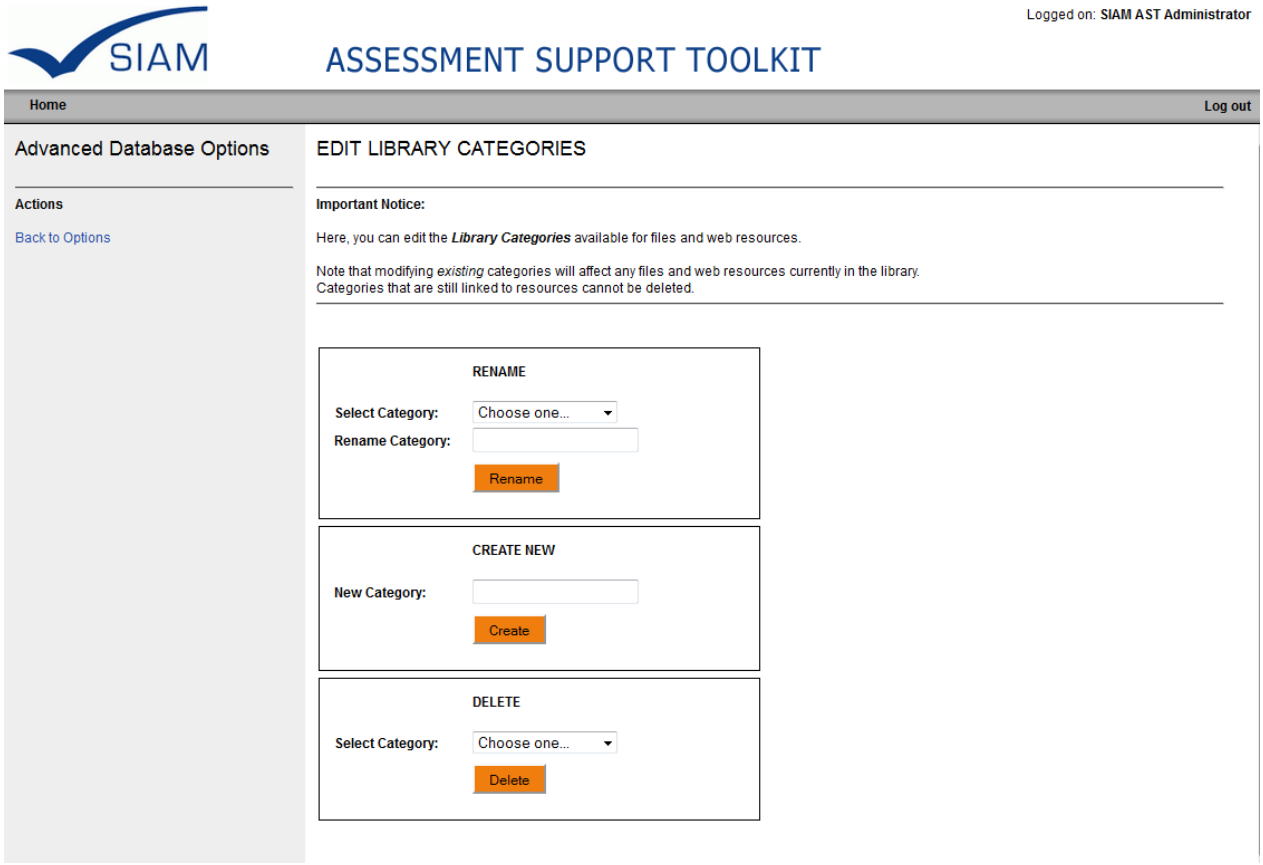


Figure 28: Advanced Database Options - Editing Library Categories

Note that renaming of library categories will take instant effect in any existing assessment cases.

5.7 Editing Task Definitions

In the SIAM AST, distinct *tasks* are used as semantic attributes for assessment questions. In the assessment report, they allow an analysis of the information contributed by different assessment participants with respect to the assessment tasks to which they contribute. The list of tasks available for the semantic tagging (done during question authoring) can be edited using this advanced database action.

Note that as with all "Editing"-type database options, the renaming of tasks will take instant effect in all existing assessment questions and cases. Newly created task definitions will be available for new assessment questions which are added after the change. Deleting

task definitions is only possible if these are not actively linked to the current pool of questions. The application will perform a relevant check once a deletion is attempted.

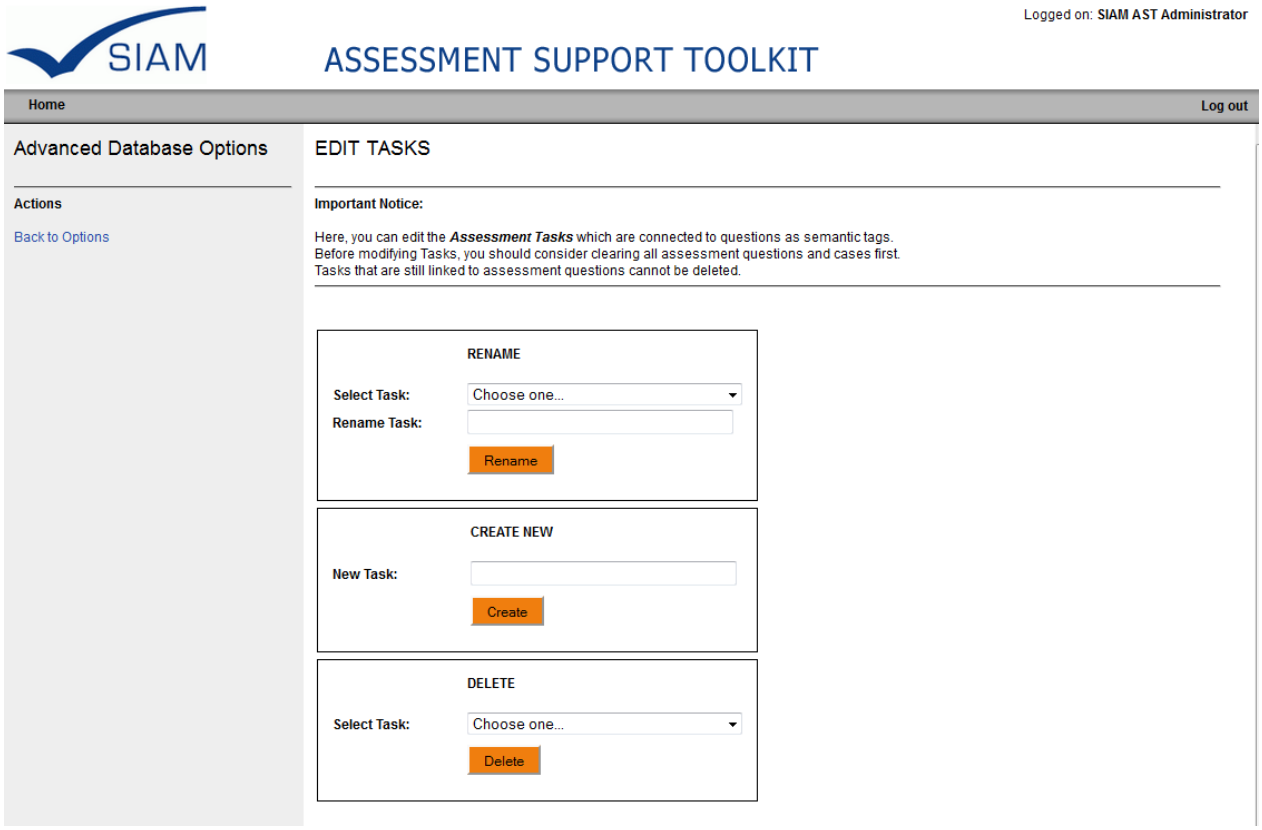


Figure 29: Advanced Database Options - Editing Tasks

The initial task definitions provided with the system are an outcome of the SIAM project and used in its specific set of questions. Note that although it is possible to use more (or less) than the seven pre-defined perspectives for the question pool, doing so has not been thoroughly tested with the toolkit. In our first preliminary tests, no negative effects could be observed, though.

5.8 Editing Perspective Definitions

In the SIAM AST, *assessment perspectives* are used as a secondary semantic attribute (in addition to *tasks*) for assessment questions. In the assessment report, they allow an analysis of the information contributed by different assessment participants with respect to the attributed assessment perspectives. The list of perspectives available for semantic tagging during question authoring can be edited using this advanced database action.

Note that as with all “Editing”-type database options, the renaming of perspectives will take instant effect in all existing assessment questions and cases. Newly created perspective definitions will be available for new assessment questions which are added after the change. Deleting task definitions is only possible if these are not actively linked to the current pool of questions. The application will perform a relevant check once a deletion is attempted.

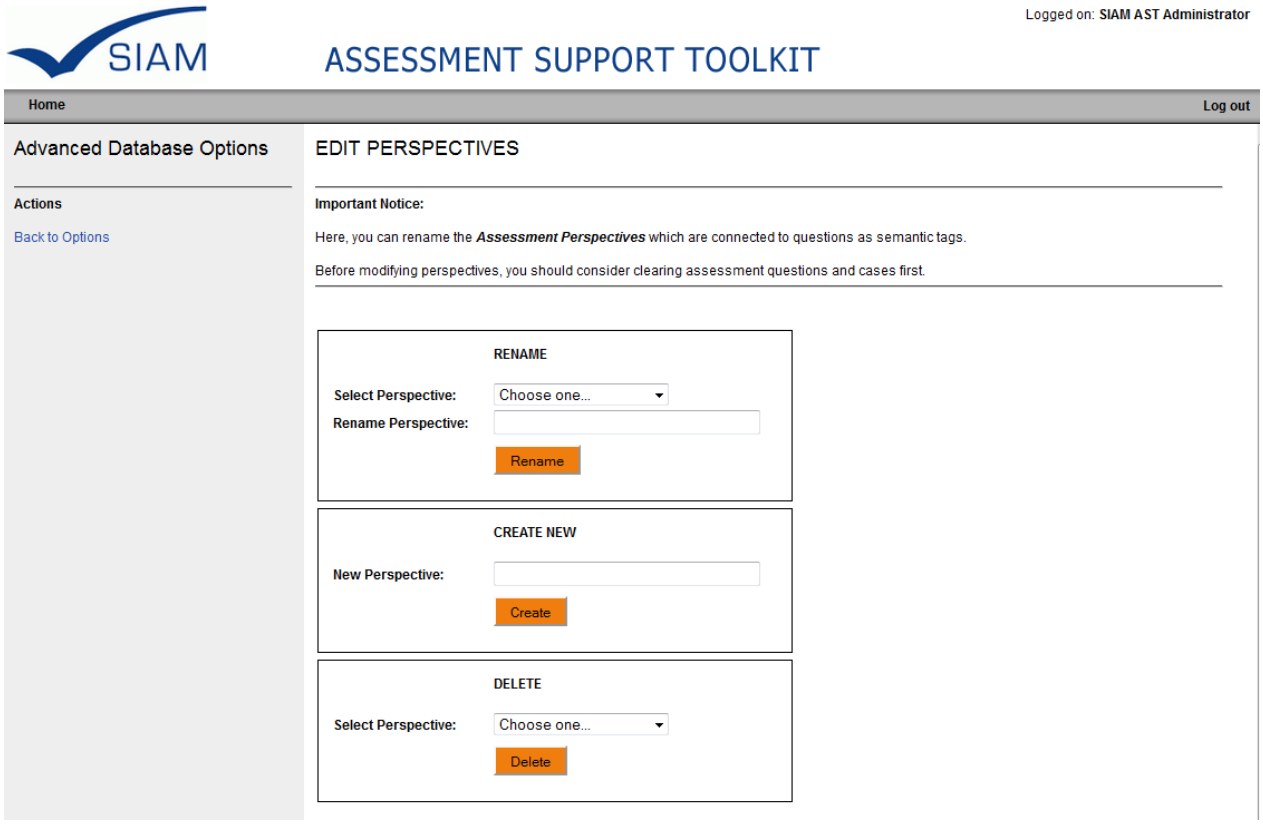


Figure 30: Advanced Database Options - Editing Perspectives

The initial perspective definitions provided with the system are a result of the SIAM project and used in its specific set of questions. Note that although it is in principle possible to use more (or less) than four perspectives for the question pool, doing so has not been thoroughly tested and may not be fully supported by all features of the toolkit.

5.9 Editing Actor Role Definitions

Actor roles play an important part in the information gathering mechanics of the SIAM AST. Roles are associated to individual actors who participate in an assessment case. With

respect to the question pool, they determine part of the relevance criteria of screens, such that particular questions can be targeted at actors of a certain role. Eventually, these relevance settings are taken into account in the calculation of assessment scores for reporting.

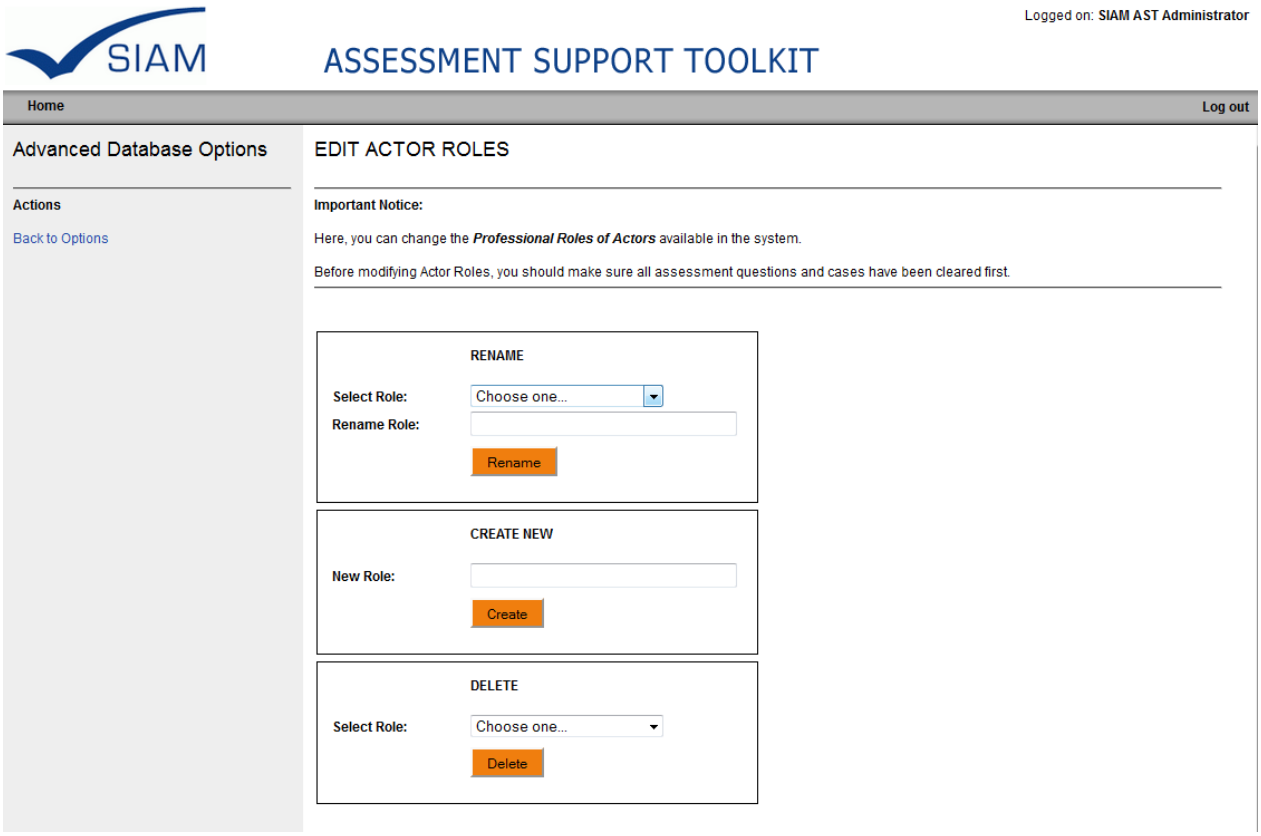


Figure 31: Advanced Database Options - Editing Actor Roles

As with all "Editing"-type database options, the renaming of roles will take instant effect in any assessment questions and cases that already exist when the change is made. Newly created roles will be available for new assessment questions which are added after the change. Deleting roles is only possible if these are not actively linked to the current pool of questions or any assessment cases, respectively.

Appendix B: SIAM AST Installation Instructions

SIAM

Assessment Support Toolkit

Installation Instructions

24 February 2014

DR RONALD R. GRAU

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SIAM AST Installation Overview

Server Software Requirements

The SIAM AST is a web-based application that requires a PHP-enabled Web server and a MySQL database server to run.

For private use and testing on a local machine, most publicly available WAMP (Windows Apache MySQL PHP) or LAMP (Linux Apache MySQL PHP) packages will satisfy the requirements for running the application. For any desktop PC or server running Windows as operating system, an example is *WAMP Server*, an open source product which is available for free use under the GPL license.

Summary of the Installation Steps

In brief, the following steps need to be performed to install the SIAM AST:

1. Install and configure a web server
2. Install and configure a database server
3. Download the SIAM AST application files archive and unpack to a temporary directory.
4. Copy the SIAM AST application files to the web-root directory of the web server
5. Install the SIAM AST database
6. Configure E-mail support (optional)

Note that the installation parts of step 1 and step 2 are usually performed together when installing a WAMP or LAMP software package on a local computer.

Application Access Levels

The SIAM AST has two levels of access, realised through dedicated user interfaces:

1) A user level, which allows the creating and editing of assessment cases, performing of assessments, and generating of reports.
2) An administration level, which offers features for changing the core data of the system, and for creating and managing user accounts.

Both user interfaces can be accessed via the main login page:
`http://<server name>/<SIAM AST web directory>/index.php`

SIAM AST Installation and Configuration Details

Web Server

We recommend to install the SIAM AST on an Apache Web Server, version 2.2.22 or higher. No special settings need to be modified but the toolkit does require PHP to be interpreted by the server (usually enabled by default).
The server can either be installed separately, or in the course of installing a WAMP or LAMP package.

PHP

The SIAM AST requires PHP version 5.3.10 or greater.

We recommend the following PHP settings to be enabled:

file uploads
allow url fopen
y2k compliance
output buffering

The following PHP extensions should be active, too:

php_gd2
php_mbstring
php_mysql
php_mysqli
php_pdo_mysql

Application Files and Permissions

Copy the entire directory structure and files of the SIAM AST to your designated web directory. It is good practice to first create a separate folder within the www-root directory of the web server, e.g. “SIAM”. Then copy the SIAM AST files into this web folder.

For example, if your web server’s local www-root directory is

`C:\wamp\www\`

Create a folder `"SIAM"` there and copy all files into `C:\wamp\www\SIAM\`

Technical note:

There are two folders within the SIAM AST application structure for storing uploaded files. Once all application files have been copied, the web server needs write permissions on these directories. (These would now be located in the SIAM folder we just created):

- Files attached to questions: `/coredata/files/`
- Files attached to answers: `/coredata/documents/`

In a normal installation using Apache web server, there is usually no action required (no permissions need to be manually set or modified). The above is just for information should any "Permission denied" errors occur during file upload actions with the SIAM AST (e.g., when attaching documents to answers as a normal user).

MySQL Server

SIAM AST requires a MySQL 5 database server, which stores all information required to run the application and also the data generated by any assessment cases created with the toolkit.

The MySQL server can either be installed separately, or as part of a WAMP or LAMP package.

Installing the SIAM AST Database

The SIAM AST database structure and the initial core data can be created easily by opening an installation script in the web browser. To install the SIAM AST database do the following:

After both the Web server and the SQL server have been set up, and the application files copied into your SIAM AST web folder, open the following URL in your browser:
`http://<server name>/<SIAM AST web folder>/`

For a local installation, the <server name> is usually *localhost*.

The <SIAM AST web folder> is where you copied the application files into, e.g. *SIAM*

For the above example, the URL to call would then be:
`http://localhost/SIAM/`

Upon first start-up, the SIAM AST application will detect automatically if a database installation needs to be performed and prompt the user to do (Figure 32).

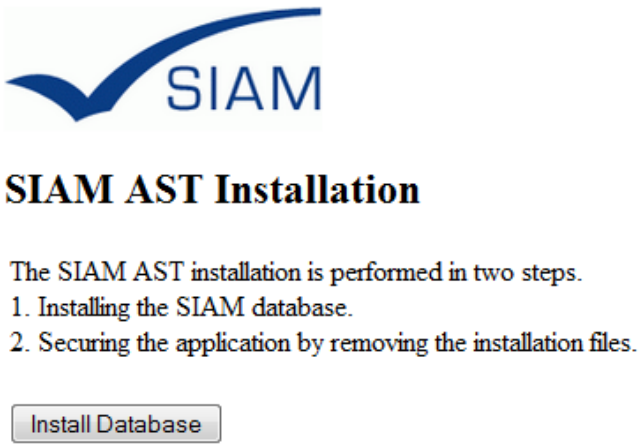
SIAM
SIAM AST Installation
The SIAM AST installation is performed in two steps.
1. Installing the SIAM database.
2. Securing the application by removing the installation files.
Install Database

Figure 32: Main Installation Page on First Start-up

On clicking the button "Install Database", a page with installation setting is shown (Figure 33). This page allows adjusting installation and application parameters before the database is being deployed.

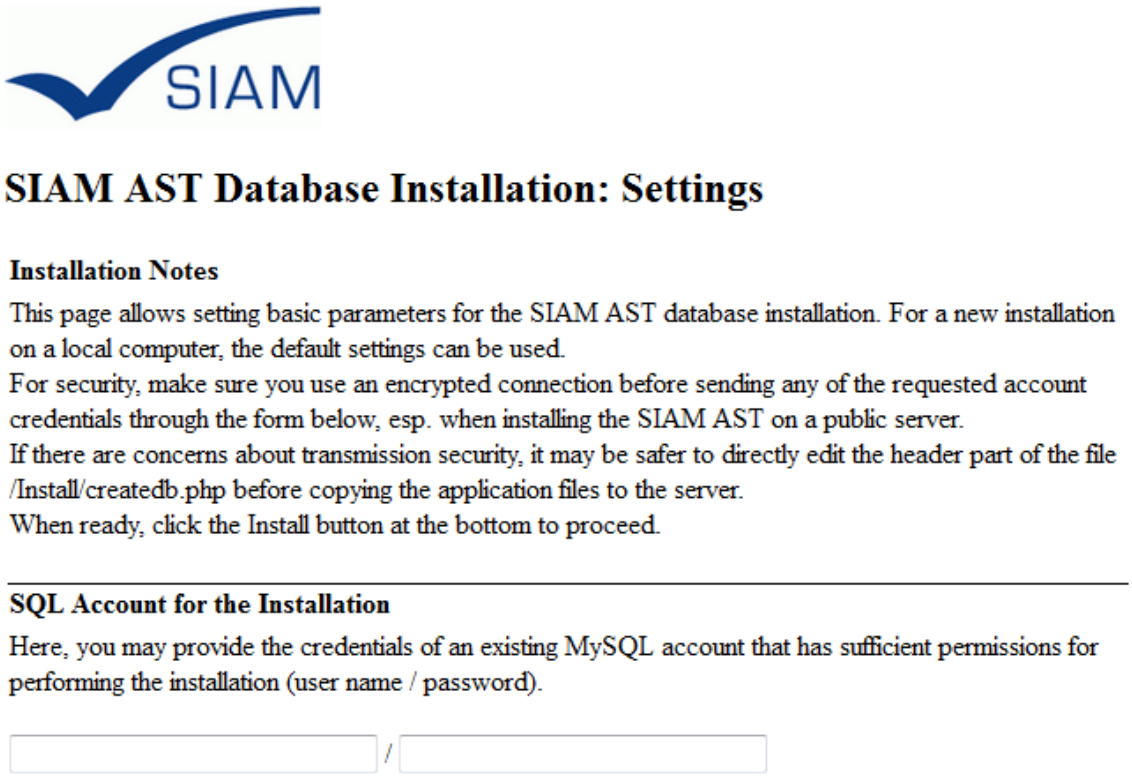
SIAM
SIAM AST Database Installation: Settings
Installation Notes
This page allows setting basic parameters for the SIAM AST database installation. For a new installation on a local computer, the default settings can be used.
For security, make sure you use an encrypted connection before sending any of the requested account credentials through the form below, esp. when installing the SIAM AST on a public server.
If there are concerns about transmission security, it may be safer to directly edit the header part of the file /Install/createdb.php before copying the application files to the server.
When ready, click the Install button at the bottom to proceed.
SQL Account for the Installation
Here, you may provide the credentials of an existing MySQL account that has sufficient permissions for performing the installation (user name / password).
/

Figure 33: Database Installation Settings page (1/4)

The installation script needs the credentials of an SQL user account for establishing a connection to the database server. Depending on the actions selected further down the form, this account needs sufficient permissions to create a database, create another SQL user account, grant user permissions to this account, create database tables, and perform data insert operations on these tables.

When installing the SIAM AST on a local computer, the default settings should be used. This will create a database container named “siam”, a user account named “siam_db_user” with all privileges granted for this database, and all required SIAM database tables. Further, the initial SIAM dataset will be imported. The SIAM AST application will work instantly as it has been preconfigured to use these settings.

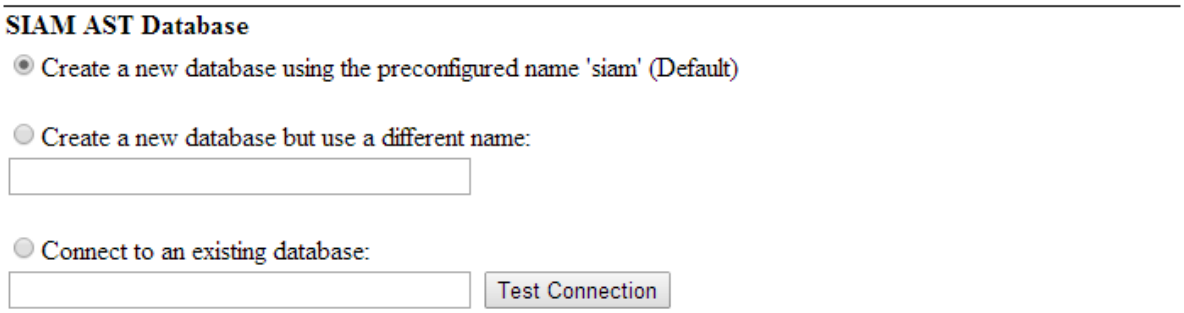
SIAM AST Database
Create a new database using the preconfigured name 'siam' (Default)
Create a new database but use a different name:
Connect to an existing database:
Test Connection

Figure 34: Database Installation Settings page (2/4)

By selecting any of the alternative options, the database name can be changed before creation, or no database created but an existing database used (Figure 34). Similarly, a different user account can be created or an existing account used (Figure 35). The information stored in the *original* SIAM AST configuration files will be updated automatically during installation - no manual editing is required.

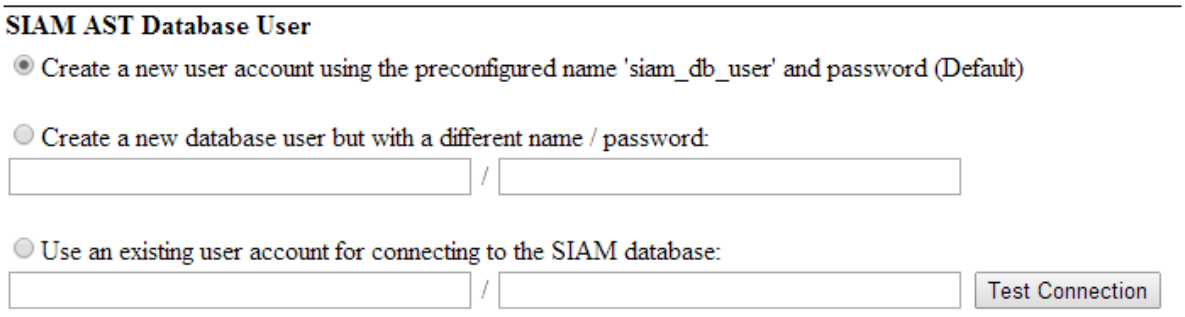
SIAM AST Database User
Create a new user account using the preconfigured name 'siam_db_user' and password (Default)
Create a new database user but with a different name / password:
/
Use an existing user account for connecting to the SIAM database:
/
Test Connection

Figure 35: Database Installation Settings page (3/4)

The last setting on the page concerns the data import options (Figure 36). When selecting the default option, the standard dataset will be imported from the file SIAM_DATA.sql, which resides in the /install directory.[8]

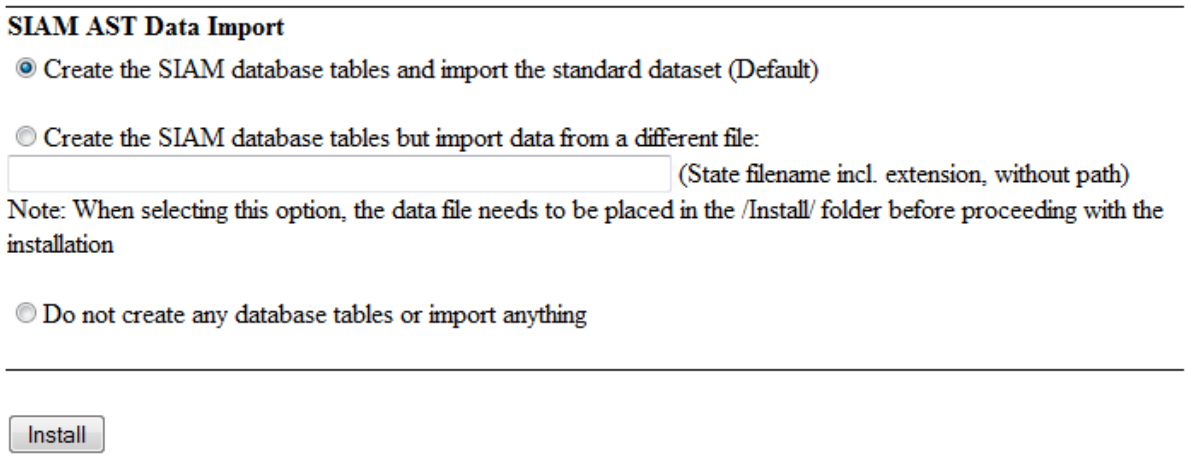
SIAM AST Data Import
Create the SIAM database tables and import the standard dataset (Default)
Create the SIAM database tables but import data from a different file:
(State filename incl. extension, without path)
Note: When selecting this option, the data file needs to be placed in the /Install/ folder before proceeding with the installation
Do not create any database tables or import anything
Install

Figure 36: Database Installation Settings page (4/4)

A modified dataset can be imported by either overwriting the above file and selecting the default option; or copying another data file into the /install directory, selecting the second option, and stating the new file name before proceeding with the installation. Selecting the third option will skip the entire installation part that is about creating database tables and importing data.

Sometimes, it may be necessary to use other than the default settings, especially when the system is to be installed on Web- and/or database servers that already exist as part of the network infrastructure of an organisation (like a University, for instance). In such case, the installing user does normally not have the required permissions to create new databases or database users, or grant any permissions to users. Instead, only pre-defined database- and user names may be available to install the system with. Figure 37 shows an example of how the SIAM AST installation parameters can be adjusted to allow an installation in environments with such technical restrictions. By configuring the system to use both an existing database container, as well as an existing user account, the related permissions to create these are not required anymore to install the SIAM AST.

[8] When setting up the database manually, the database can be created by importing this file into a common database management tool, like phpMyAdmin.

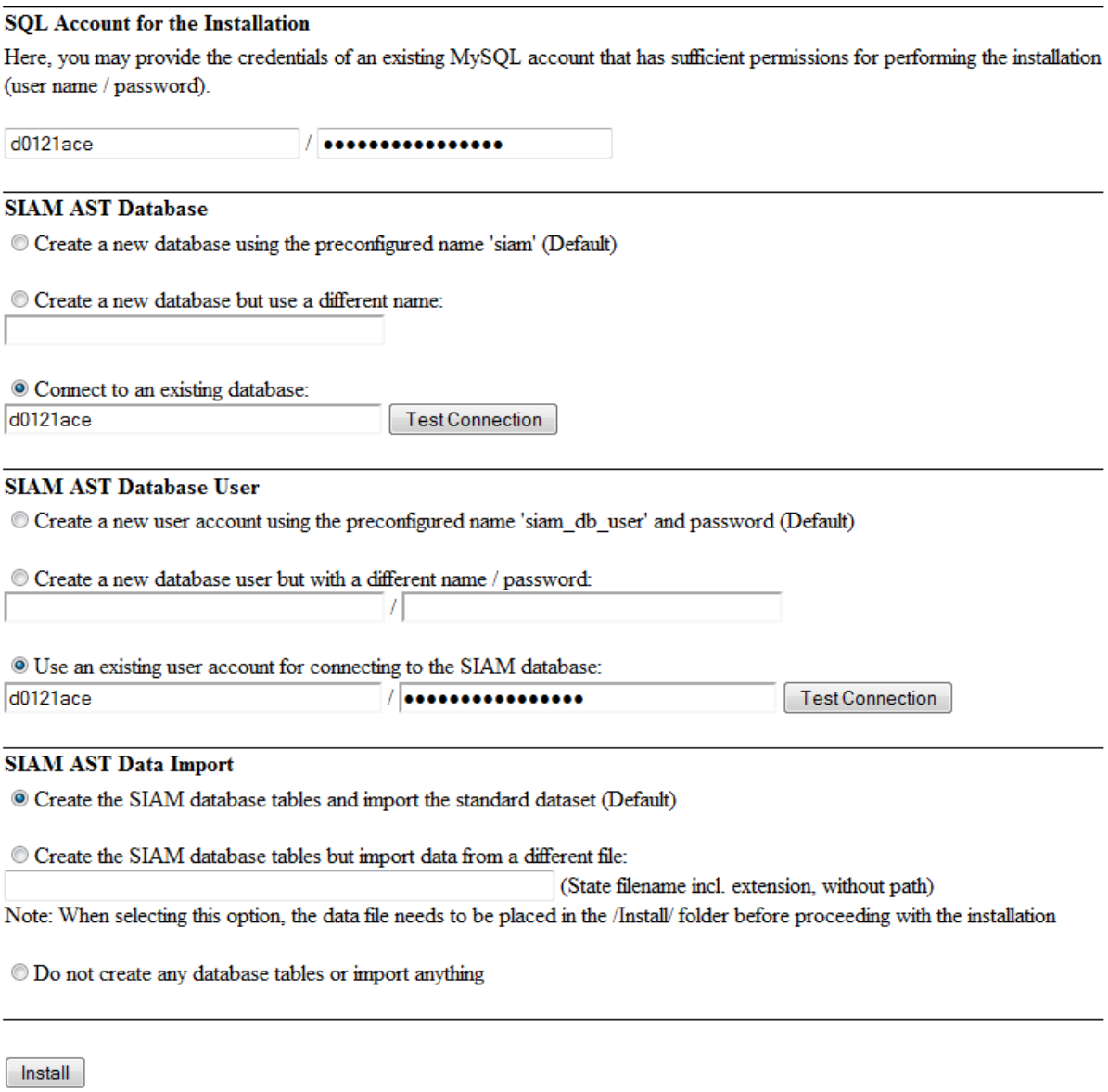
SQL Account for the Installation
Here, you may provide the credentials of an existing MySQL account that has sufficient permissions for performing the installation (user name / password).
d0121ace
SIAM AST Database
Create a new database using the preconfigured name 'siam' (Default)
Create a new database but use a different name:
Connect to an existing database:
d0121ace
Test Connection
SIAM AST Database User
Create a new user account using the preconfigured name 'siam_db_user' and password (Default)
Create a new database user but with a different name / password:
Use an existing user account for connecting to the SIAM database:
d0121ace
Test Connection
SIAM AST Data Import
Create the SIAM database tables and import the standard dataset (Default)
Create the SIAM database tables but import data from a different file:
(State filename incl. extension, without path)
Note: When selecting this option, the data file needs to be placed in the /Install/ folder before proceeding with the installation
Do not create any database tables or import anything
Install

Figure 37: Custom Settings Example

When configuring the installer to use an existing database, and/or an existing user name, clicking the related buttons “Test Connection” will open an additional window and a connectivity check will be performed using the names or credentials provided.

After entering a database name and clicking the nearest “Test Connection” button, the test script will attempt to establish a connection to a database of the given name (Figure 38), using the SQL account credentials stated at the top of the form.

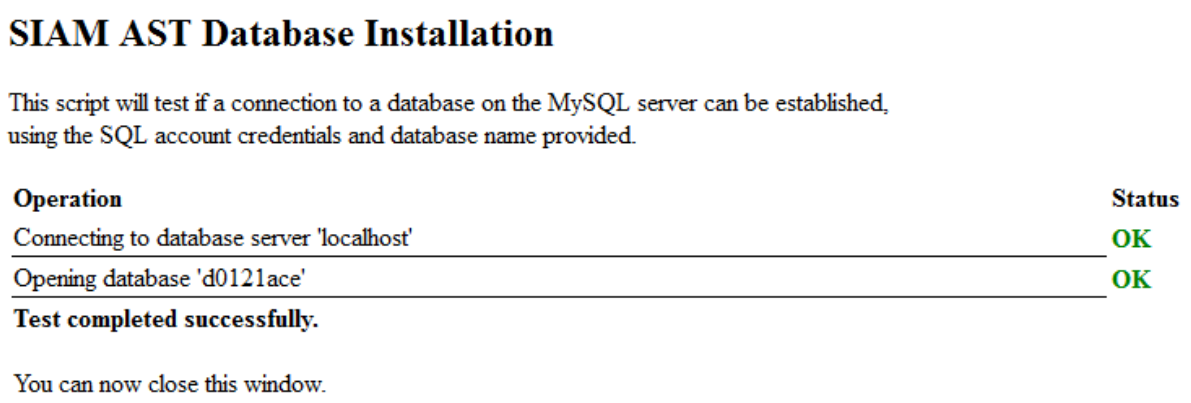
SIAM AST Database Installation
This script will test if a connection to a database on the MySQL server can be established,
using the SQL account credentials and database name provided.
Operation
Status
Connecting to database server 'localhost'
OK
Opening database 'd0121ace'
OK
Test completed successfully.
You can now close this window.

Figure 38: Checking Connectivity to an Existing Database

Similarly, after entering an existing user name and password, and clicking the "Test Connection" button next to the related form fields, the opening test script will attempt to establish a connection to the database server using the given user name and password as credentials (Figure 39).

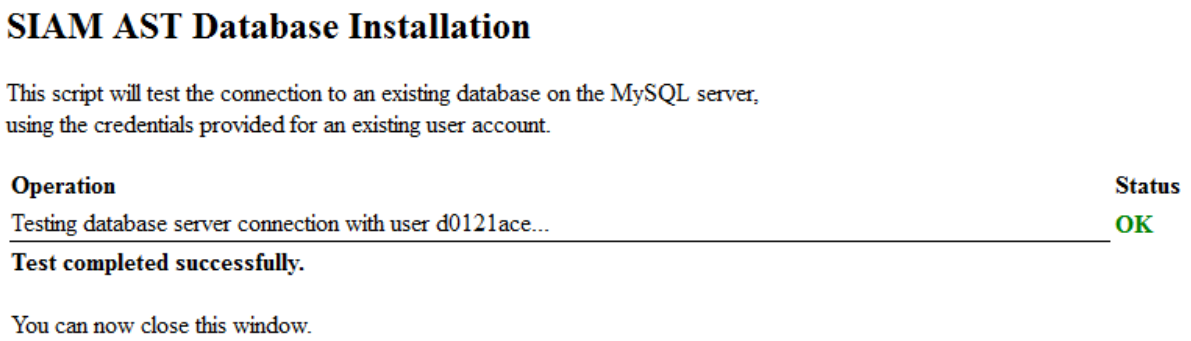
SIAM AST Database Installation
This script will test the connection to an existing database on the MySQL server,
using the credentials provided for an existing user account.
Operation
Status
Testing database server connection with user d0121ace...
OK
Test completed successfully.
You can now close this window.

Figure 39: Checking Connectivity with an Existing User Account

Note that when using an existing user account, the installation script does not attempt to grant particular permissions to this account in relation to any to-be-created or pre-existing databases. You need to make sure the user account has sufficient permissions on the chosen database container to create database tables and insert, update, and delete contents (Which is usually the case).

Once all settings have been made and the "Install" button clicked, the database installation script will be started. Remain patient, as it may take about half a minute before any protocol feedback is reported on screen, especially when installing on servers that reside on a network.

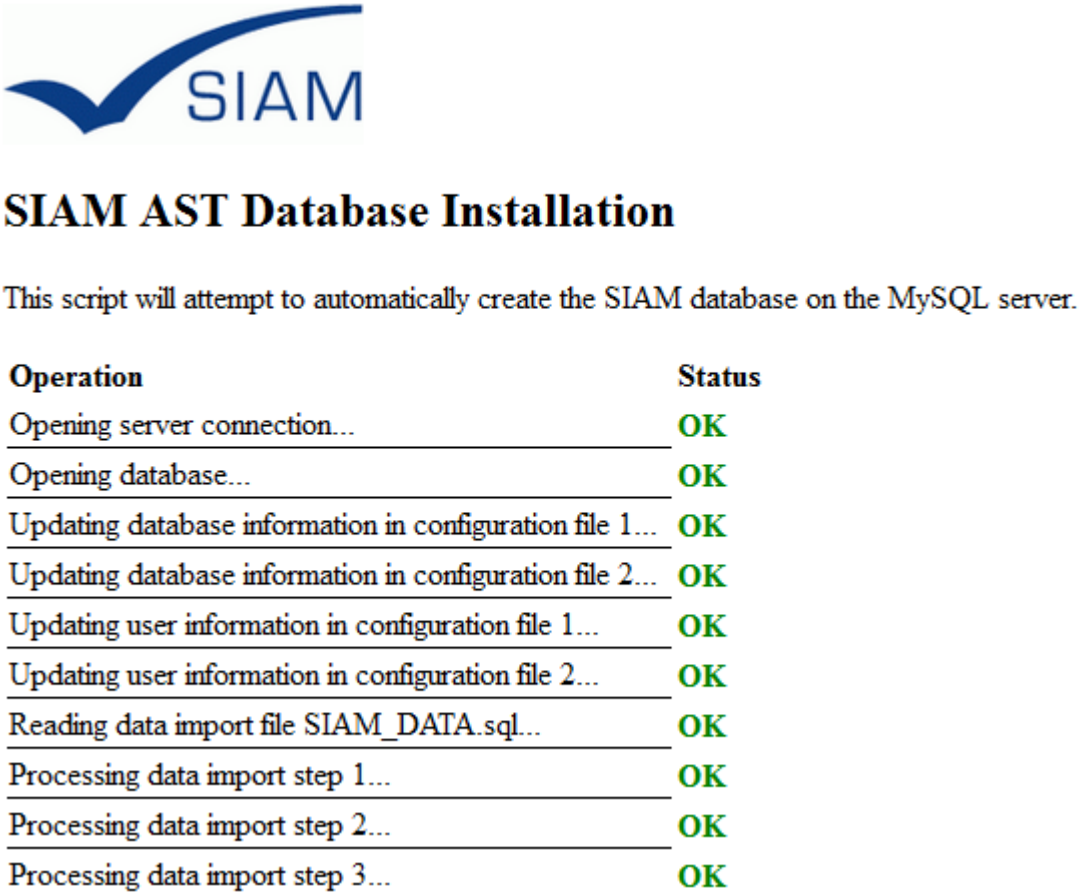
SIAM
SIAM AST Database Installation
This script will attempt to automatically create the SIAM database on the MySQL server.
Operation
Status
Opening server connection... OK
Opening database... OK
Updating database information in configuration file 1... OK
Updating database information in configuration file 2... OK
Updating user information in configuration file 1... OK
Updating user information in configuration file 2... OK
Reading data import file SIAM_DATA.sql... OK
Processing data import step 1... OK
Processing data import step 2... OK
Processing data import step 3... OK

Figure 40: Installation Protocol (top section)

The installation script will perform a series of steps such as:

- Opening a database server connection
- Creating and/or opening a database container
- Creating a new user account and granting permissions to it, or
- Adjusting the system configuration files to use existing credentials
- Creating the database tables
- Importing the standard data set

The partial screen shot in Figure 40 shows the installation progress based on the previous custom settings made (Figure 37).

Once all steps have been processed without problems, the script will report “Process completed successfully” at the end (Figure 41).

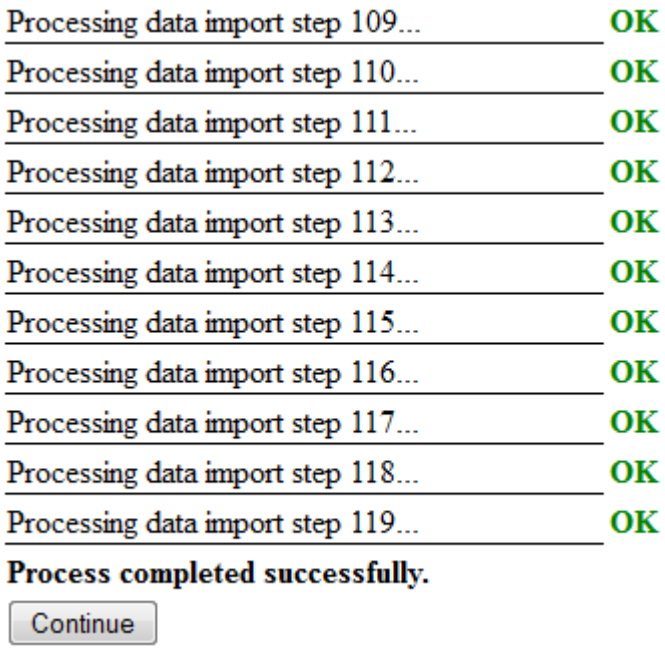
Processing data import step 109... OK
Processing data import step 110... OK
Processing data import step 111... OK
Processing data import step 112... OK
Processing data import step 113... OK
Processing data import step 114... OK
Processing data import step 115... OK
Processing data import step 116... OK
Processing data import step 117... OK
Processing data import step 118... OK
Processing data import step 119... OK
Process completed successfully.
Continue

Figure 41: Installation Protocol (bottom section)

If there were any problems during installation, the bottom line will say “Process completed with errors”, and a short statement about what went wrong given below. In such case, the problem will also be clearly indicated somewhere further up in the protocol. It then needs to be resolved and all changes rolled back before another installation attempt can be made. In particular, and depending on which actions have been performed, this means deleting any newly created database container and/or database user account, as well as replacing any modified configuration files with their original versions (If the installing user doesn’t know which files to replace, once again copying over all application files to the server will do the trick).

Once this step has been completed with success, click the “Continue” button (Figure 41).

The main installation page will open, indicating that the first of the two SIAM AST installation steps has been completed (Figure 42).

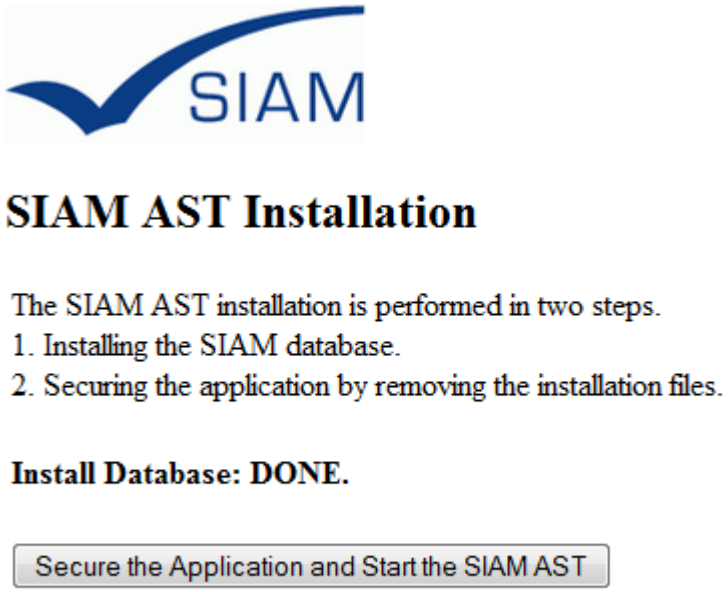
SIAM
SIAM AST Installation
The SIAM AST installation is performed in two steps.
1. Installing the SIAM database.
2. Securing the application by removing the installation files.
Install Database: DONE.
Secure the Application and Start the SIAM AST

Figure 42: Main Installation Page after Database Setup

After the database has been installed, the SIAM AST application needs to be secured. This step is very simple: Just click the button "Secure the Application and Start the SIAM AST".

In practice, what happens next is that all installation scripts will be physically deleted from the server. Once these files are gone, the SIAM AST login page will be automatically unlocked so that entering the base URL of the SIAM AST which we previously used to start the installation (for instance, on a local computer: `http://localhost/SIAM/`) , will then show the login page (Figure 43).

Figure 43: SIAM AST Login page (After Securing the Application)

Technical Note:

The SIAM AST installation scripts are only to be used once, when the system is being set up on a computer for the first time. If these routines were executed again after the system was installed and then actively used for assessment, this would likely cause loss of assessment data. Deleting the installation scripts, after the system has been set up successfully, is therefore a safeguard to prevent accidental damage to any data which has been stored in the database whilst the SIAM AST was used for assessment.

Configuring Email Support (optional)

If enabled, the AST uses email exclusively in the administration console, in order to inform registered users when a new account has been created for them, or when their password has been reset by the SIAM AST Administrator. Email is not used at all in the actual AST user application because this employs a dedicated messaging system, built into the toolkit software.

However, note that the administration console can be used without email support so that having email enabled is therefore not a strict requirement. In fact, the use of email is switched off by default. This can be changed by editing the console's configuration file:

To enable, set `$usemail = "1";` in `/coredata/includes/config.php`

To disable, set `$usemail = "0";` in the same file.

If you choose to enable the use of email for the administration console, you also need to tell the application which mail server settings to use:

```
$mailhost = "<the IP or domain name of the SMTP server>";
// e.g., "mail.yourdomain.net"

$mailport = "<SMTP port>";
// server port for sending mail, usually "25", "587", or "465"

$mailaddr = "<the email address of the sender>";
//e.g., siamadmin@yourdomain.net";

$smtpuser = "<user name for authentication at the SMTP server>";

$smtppass = "<password for the above account>";
```

Technical Note:

Most public web servers will have sendmail support enabled by default, i.e. switching on email support for the AST application as instructed above will then instantly work. If it does not, contact your web server administrator for help.

To enable email for a local WAMP or LAMP installation, install and configure PEAR:

- Download http://pear.php.net/go-pear.phar and save this file in the directory that contains the file `php.exe` (e.g., `C:\wamp\bin\php\php5.3.10\`).
- Open an admin terminal (Linux) or the command console as Administrator (Windows), navigate to the above directory, and perform the following commands:
  - `php -q go-pear.php`
  - `pear install -o Net_SMTP`
  - `pear install Mail Mail_mime`
- Uncomment the following in the `php.ini` file: `extension=php_openssl.dll`
- Add the file system path of PEAR in `php.ini`, e.g., add the following line:
  `include_path = ".;C:\wamp\bin\php\php5.3.10\PEAR"`
- Restart the web server for the changes to take effect

Application Settings (Optional)

The SIAM AST application has two configuration files which can be edited to change global system settings and behaviour.

After a standard installation, there is usually NO NEED to make any modifications here at all. The system should run instantly, without any changes to these files.

Technical Note:

Edit

`/model/db.class.php`

in order to change the database connector settings for the SIAM AST user level interface. This may be necessary if your database name is different from the default setting or if you've modified the user account that accesses the SIAM AST database.

Edit

`/coredata/includes/config.php`

in order to enable welcome emails or change the database connector settings for the SIAM AST administration console.

First Use

- Open a Chrome browser
- Enter the SIAM AST URL:
  `http://<server name>/<SIAM AST web directory>/`
  For instance, this is the URL to use for a local installation:
  `http://localhost/SIAM/`
- Log in to the SIAM AST using the default Administrator account (admin/admin).
- You should now see the main menu and an empty dashboard.
- Click on the PROFILE option and change the password of the default administrator account.
  Consider that a strong password uses a combination of letters, numbers, and special characters.
  Make sure you remember the password chosen!
- Log out.
- On the SIAM AST login page, click the “Administration Console” link.
- Log in using “admin” as user name and your newly set password.
- Click on “Manage User Accounts” and create additional users, as necessary. The default user type for the SIAM AST user level interface is “Contributor”. Assign the other types (Administrator, or Developer) only to those users that need access to the administration console.
- Log out of the Administration Console when finished.